YEARBOOK OF AGRICULTURE 1930

S. F. Ashby

16/5/30

UNITED STATES
DEPARTMENT OF AGRICULTURE

ARTHUR M. HYDE
Secretary

YEARBOOK OF AGRICULTURE 1930

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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1930

For sale by the Superintendent of Documents, Washington, D. C. - - - - - Price $1.50

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Corrected to March 1, 1930

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FOREWORD

THIS Yearbook of Agriculture, like those issued for the three preceding years, assembles a great variety of recent scientific, technical, and economic information in short, popularly written articles and in agricultural maps and statistical tables. It is a comprehensive chronicle of contemporary progress in agricultural science and practice. Its primary object is to facilitate practical application of the continually increasing fund of scientific knowledge. ¶Covering so wide a field, it necessarily deals with many subjects in broad outline rather than in minute detail; but the gain seems worth the sacrifice. The reader gets here what he can get nowhere else, namely, a glance at what is going on in all branches of agricultural research and farm technique. Other publications issued by the Department of Agriculture go exhaustively into specialized subject matter. This one alone gives a general picture of the agricultural industry in all its principal phases. Furthermore, the book furnishes a prompt outlet for much valuable new knowledge the publication of which might otherwise be long delayed. ¶Farmers, for whom the book is primarily intended, will recognize that they can get more detailed information through the extension service or by writing to the department. Research workers and technicians likewise will have no difficulty in supplementing the information herein contained with more detailed data from other sources. ¶Though brief, the Yearbook articles do not lack scientific authority and precision. All the contributors are members of the department, expert in their respective fields; and the facts and conclusions reported have in every case been reviewed by many different specialists. It is worth noting incidentally that the writers have expressed complex and difficult matter in a simple and readable manner. ¶As usual, the Annual Report of the Secretary of Agriculture to the President is included. Previous Yearbooks in this series have proved very popular. I am confident that this one will have an equally wide appeal.

ARTHUR M. HYDE,
Secretary of Agriculture.

MARCH 1, 1930.

Beginning with this 1930 issue, the Yearbook of Agriculture, in conformity with the practice generally followed in the publication of yearbooks, is designated by the year in which it is printed rather than by the year surveyed. Thus the present volume surveys agricultural conditions in 1929. The new system of dating more truly indicates the strictly up-to-date character of the volume. This procedure does not break the continuity of the statistical and other material published, nor does it involve any omission in the Yearbook series.

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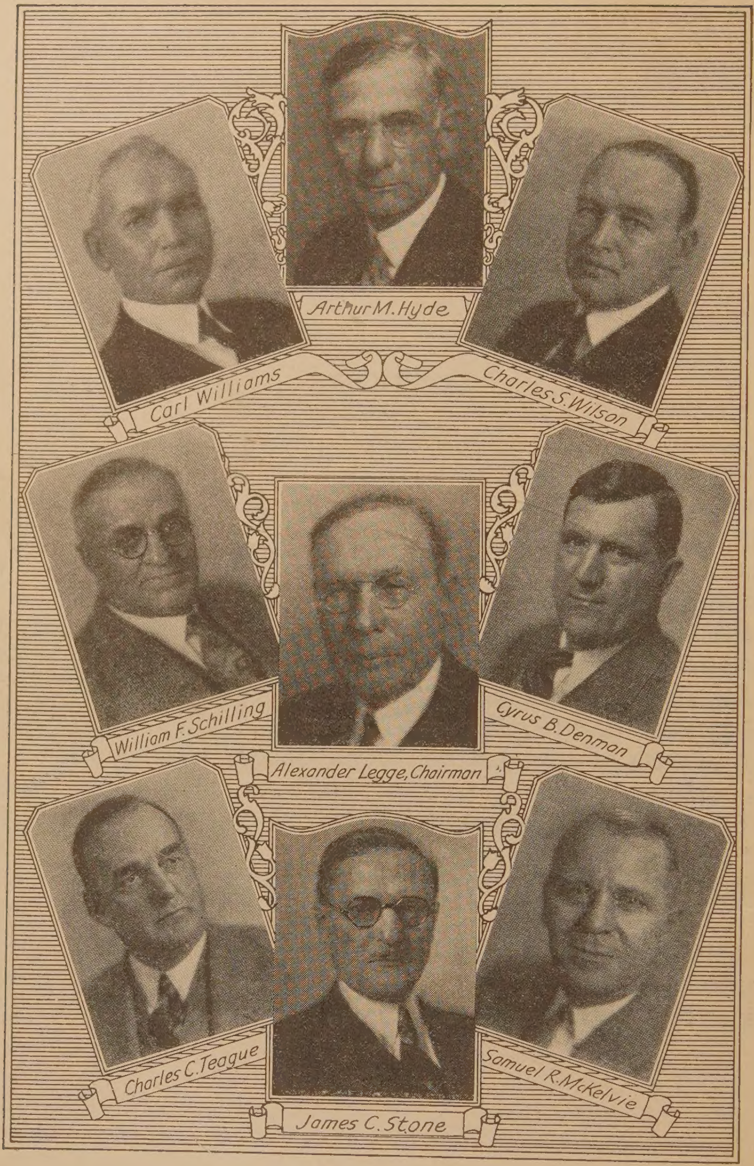

THE FEDERAL FARM BOARD

The Federal Farm Board appointed by President Hoover under the agricultural marketing act of June 15, 1929. Arthur M. Hyde, Secretary of Agriculture, is a member of the board ex officio. The other members are: Alexander Legge, of Illinois, chairman, formerly president of the International Harvester Co.; James C. Stone, of Kentucky, vice chairman, formerly president of the Burley Tobacco Growers Cooperative Association, representing tobacco; Carl Williams, of Oklahoma City, editor of the Oklahoma Farmer-Stockman, representing cotton; C. B. Denman, of Missouri, formerly president of the National Live-stock Producers Association, representing livestock; Charles C. Teague, of California, formerly president of the California Fruit Growers Exchange and the Walnut Growers Cooperative Association of California, representing fruits and vegetables; William F. Schilling, of Minnesota, formerly president of the Twin City Milk Producers Association, representing dairy products; Charles S. Wilson of New York, formerly commissioner of agriculture in New York, representing fruits and vegetables; Samuel R. McKelvie, of Nebraska, publisher of the Nebraska Farmer, representing grain

THE YEAR IN AGRICULTURE

THE SECRETARY'S REPORT TO THE PRESIDENT

WASHINGTON, D. C., *November 15, 1929.*

To the PRESIDENT:

Widespread drought during the growing season of 1929 dried up pastures and reduced crop yields below those of any recent year. The losses in production, however, were so evenly distributed for the country as a whole that no large area had either very bountiful or very short crops. Moreover, from the standpoint of the producers, reduced yields seemed likely to be more than offset by price advances. It is probable that the total income from agricultural production for the 1929–30 crop year will equal, if it does not exceed, that of the 1928–29 season.

Cool spring weather, with heavy rains, delayed planting in many sections of the West and Northwest. Planting was exceptionally backward in the States from Ohio to Missouri, where some corn was not put in the ground until July. Rainfall was light and spotty during the early summer, especially in the northern half of the country. A general drought developed during August, except in the far Southwest. Conditions improved somewhat during September, and some crops turned out rather better than had been expected.

Growers planted a total acreage about equal to that of 1928. Yields were disappointing in practically all crops, except irrigated crops and some varieties of hay. The hay crops that turned out well made heavy growth before the drought became severe. All crops combined gave a yield per acre 7.4 per cent below that of 1928 and 4.1 per cent below the average for the preceding 10 years. Lower than average yields were experienced in 29 States. The western Great Plains suffered most from the drought. Yields were reduced along the Atlantic coast from Massachusetts to North Carolina and in all the North Central States except Wisconsin. California and Washington suffered from drought during the winter of 1928–29, and California fruits were injured by a severe freeze in April. The late spring reduced yields somewhat in the other fruit-producing areas, except the apple-producing sections of Virginia and West Virginia.

Reduced Yields in Corn

Corn production was 2,528,000,000 bushels, or 308,000,000 bushels less than in 1928. With the exception of the crop of 1924, this year's corn crop is the smallest since 1918. The acreage in corn was smaller than in 1917; but reduced yields were the principal cause of the

reduced production. New England, New York, and the Southern States east of the Mississippi River produced more corn than in 1928. Corn production in the northern part of the Corn Belt was not materially below that of the previous year. The yields were reduced most in the area just north of the Ohio River, in Missouri, in Kansas, and in the far Southwest. The production of grain sorghums, which supplement corn for feed in the southwestern area, totaled only 93,000,000 bushels, as compared with 142,000,000 bushels in 1928 and an average of 128,000,000 bushels for the past five years.

Wheat production, winter and spring varieties combined, totaled about 792,000,000 bushels, as compared with 902,000,000 bushels in 1928. This output was between 4 and 5 per cent less than the annual average for the previous five years, though the harvested acreage was about 9 per cent larger. The greatest decline was in spring wheat, the production of which was only 224,000,000 bushels, as compared with 324,000,000 bushels in 1928. Durum wheat production was only 53,000,000 bushels, against 93,000,000 bushels in the previous year. The acreage in durum wheat was only 80 per cent of the 1928 acreage. Production of winter wheat was about 10,000,000 bushels less than in 1928, though the acreage harvested was 10 per cent greater. The hard winter wheat crop in the western Great Plains was reduced materially. Soft winter wheat production, however, was somewhat above the unusually small crop of 1928 and nearly equal to the average for the previous five years.

Oats Production Below 5-Year Average

Oats production was about 120,000,000 bushels less than the average for the preceding five years, and barley production was 104,000,000 bushels above that average. Output of both crops was smaller than in 1928. Their production was fairly well distributed over the country. Flax production was only 16,600,000 bushels, as compared with 18,700,000 bushels in 1928 and an average of 23,200,000 bushels for the preceding five years. Acreage seeded to flax was 17 per cent greater than in 1928, but yields were greatly reduced by frosts early in the year and by drought early in the summer. The yield per acre averaged only 5.4 bushels, the lowest since the unusually dry year, 1919.

Cotton production, according to the October estimate, was 14,915,000 bales, as compared with 14,478,000 bales ginned last year. This output was grown on an acreage only slightly below the record acreage of 1926. Yields, however, were greatly reduced by drought in Oklahoma and in much of Texas. The eastern part of the Cotton Belt had about an average yield. In that section heavy weevil infestation in the fall of 1928 and a mild winter in 1928–29 threatened heavy losses from the boll weevil. The dry summer, however, helped to control the insect. Potato production was about 345,000,000 bushels, as compared with the excessive production of 454,000,000 bushels in 1928. Drought and excessive heat in many States were unfavorable to the crop. In the Northern States rains in early September were so closely followed by frosts that the crop could not recover. Yields of potatoes were light everywhere, except in northern New England and a few of the Western States. The acreage planted to potatoes was very close to the average for recent

years. It seems probable that the reduced potato crop will bring the farmers considerably more than last year's heavy crop brought them. Should present prices prevail for the marketing season, the income from potatoes will be approximately 75 per cent greater than in 1928.

Tobacco production was above that of 1928 and above the average for the preceding five years. This crop was planted on an acreage nearly 6 per cent greater than that in the previous year, and yields were about the same. Moreover, the quality of the crop is better, while prices for most kinds are at least equal to those of last year. Hay production was rather unevenly distributed, though the yield for the country as a whole was about the average, and acreage also was about the average. The crop was unusually good in the North Central States east of the Mississippi River and also west into Missouri, Iowa, and most of Nebraska. West of these States in a semicircular area extending from Arkansas through Oklahoma and Texas and parts of Kansas and Colorado into the Dakotas, hay production was sharply reduced. It was light also in most of the Northwest. Fruit production was generally low. The apple crop was reduced in some of the Northern States by dry weather. The Southern peach crop suffered from unfavorable weather at blooming time and from rain during the harvesting period. Citrus fruits in Florida suffered from drought in the winter of 1928–29 and bloomed only lightly in the spring. As already noted, deciduous fruits in California were damaged by a freeze in April. Yields of tree and vine fruits averaged about one-fourth less than in 1928.

WHEAT

Though this season's wheat crop is considerably smaller than that of 1928, it may return the growers a larger income. Wheat prices have been substantially higher so far this season than they were during the corresponding period of the 1928–29 season. A reduction in our wheat output is offset by an increase in the carry-over from the previous season. Stocks on July 1 totaled 245,000,000 bushels compared with 128,000,000 bushels on the same date in 1928. Income from wheat depends, however, on the world wheat situation as well as on the situation in the United States. The world's production of wheat outside Russia and China in 1929, according to the reports now available, is about 3,400,000,000 bushels, or 500,000,000 bushels less than the record crop of 1928. As the carry-over was larger than that of the previous crop year, the total world supply for 1929–30 is only about 360,000,000 bushels less than the supply available in 1928–29. Nevertheless, the indicated reduction has raised the world price level. It seems probable that the average price for the year to United States growers will be better than the average for 1927–28.

Returns from wheat farming in recent years illustrate the familiar fact that it is not always the largest crop that brings the greatest cash return. Our wheat production in 1927 was 878,000,000 bushels. The 1928 crop was 902,000,000 bushels. Wheat marketed from the 1927 United States crop was sold at an average price at the farm of $1.19 a bushel, and brought the farmers a cash income of $862,-000,000. Wheat marketed from the 1928 crop was sold at an average

price of only $1 a bushel, and brought in a cash income of only $753,000,000. The difference in the returns from wheat in these two seasons was largely the result of a great increase in the world crop. World production outside Russia and China in 1928 was about 3,900,000,000 bushels, or 250,000,000 bushels more than in 1927.

Producers' Intentions to Plant

Winter wheat producers' plans for the 1930 crop, as expressed in intentions to plant reports, contemplated a wheat acreage 1.2 per cent greater than that seeded in the fall of 1928. Such an acreage, with average abandonment and average yields, would increase our exportable surplus of the 1930 crop and increase the dependence of the producers on the foreign market. The world market for wheat of the 1930 crop probably will be no better and may not be as good as the world market for the present season. Keen foreign competition is in prospect. Russia may again be a factor in the world's wheat market in a few years, and Canada, Australia, and Argentina are vigorous competitors of the United States. The principal wheat-exporting countries show a general tendency to expand their wheat acreage. It seems doubtful, in short, if the supplies of wheat in the world's markets during the next few years will average much under the levels for the past six years, unless an unusual combination of circumstances should give a series of low yields.

COTTON

In the 1928–29 season cotton producers received a lower price per pound, but for a larger crop they received about the same amount of cash as in the previous season. On an increased acreage they harvested 14,478,000 bales. Yields for the Cotton Belt as a whole were 3 pounds per acre below the 10-year average. In the Atlantic Coast States yields were still lower. This region had disastrous storms shortly after picking began. In many counties of the coastal plain the damage was so great that seed loans from the Federal Government were necessary for the planting of the new crop. Although production in 1928 was 1,500,000 bales greater than in 1927, the world carry-over of American cotton was greatly reduced. In consequence the total supply available for the season was only about 19,600,000 bales, as compared with 20,800,000 bales for 1927–28.

The domestic consumption of cotton was low at the beginning of the 1928–29 season but soon increased. The total for the season amounted to 7,091,000 bales, or 257,000 bales more than in the 1927–28 season. The opposite situation prevailed in the export market. Exports were large early in the season, but declined rapidly after December because of a less active European demand. As a result, despite a material reduction in foreign stocks at the beginning of the season, and lower cotton prices, Europe took practically no more American cotton than in the 1927–28 season. Japan, however, took nearly one-half million bales more. The world's consumption of American cotton in the 1928–29 season amounted to about 15,076,000 bales. The world's carry-over of American cotton at the end of the season was about 4,500,000 bales.

The 1928–29 cotton marketing season was characterized by the most stable prices which have existed in any year since the World War. The total range in the spot markets was only about 3½ cents a pound. Prices were mostly within a range of 1½ cents. For the season August 1, 1928, to July 31, 1929, Middling cotton at the 10 spot markets averaged 18.67 cents a pound, or about 1 cent a pound less than the price for the previous year. At the beginning of the 1929–30 season the world's supply of American cotton was approximately the same as at the beginning of the previous season. An increase of slightly more than 400,000 bales in the production was offset by a decrease of about 600,000 bales in the carry-over. This left a total supply for the season of about 19,400,000 bales, compared with 19,600,000 bales in the 1928–29 season. For the first two months of the current season cotton prices averaged slightly above the average for the corresponding two months of the previous season but slightly below the average for the entire 1928–29 season.

Elements of Quality in Cotton

It is important that the elements of quality in cotton be better recognized. This is a complex problem. Cotton is not a homogeneous thing but a mass of individual fibers. The department is studying the relationships that exist between the properties of the fibers and the qualities of the products into which they enter. Studies are also under way, in cooperation with the States, as to the relationship between prices paid to growers and the quality of the cotton sold. A buying system by which cotton of all qualities is bought at an average price penalizes the producer of better-quality cotton and gives an undeserved premium to the producer of inferior cotton. Study of these practices should suggest means of improvement.

In the 1928–29 season the department for the first time obtained and published information as to the number of bales of cotton of each grade and staple produced, carried over, and consumed in the United States. The production of cotton having a staple length of seven-eighths of an inch and under, and of cotton 1⅛ inches and over, was apparently ample, but cotton of 1 inch and 1 1/32 inches was relatively scarce. Our production would apparently better fit the demand in this country if less very short-staple cotton and more cotton in the range from 1 inch to 1 1/16 inches were grown.

Selection of cotton for manufacturing becomes more discriminating each year. If American growers are to improve or even to hold their present position in the world's market, more thought must be given to producing the better qualities of cotton that are most in demand. Information now gathered permits estimates of the quality of production to be made for the United States as a whole and for individual States, but not for smaller areas. It is desirable to intensify the work, so that grade and staple reports may be made for counties. Such reports would mean much to individual growers, and would facilitate improvement through community action. They would particularly emphasize the advantages of the single-variety community plan, which may hold more promise of improvement in the production of good-quality cotton than any other single action.

Moreover, the single-variety community plan offers the best foundation for community organization in merchandising.

LIVESTOCK

Further improvement was made by the livestock industry in 1929, though favorable trends were not as sharply defined as in 1928. Certain branches of the industry showed losses, but gross returns to livestock producers in the first eight months of the year were approximately $93,000,000 more than in the corresponding period of 1928. Figures showing net returns are not available, but undoubtedly the current year has been profitable for the livestock industry on the whole. Gain in gross income was effected despite a decrease of 1,187,000 head of meat animals slaughtered under Federal inspection in the first eight months of the year as compared with the number slaughtered in the corresponding period of 1928. The increased return from a reduced volume of sales was partly the result of higher average prices and partly of a higher average weight in the animals slaughtered.

Though cattlemen generally have prospered this year, some who fed cattle during the fall and winter of 1928 suffered losses. In the first three months of 1929 a slump occurred in fed-cattle prices. This reacted unfavorably on the demand for feeder cattle during the summer and the early fall. As a result, feeder-cattle prices declined sharply. On September 15 the prices of such cattle at Chicago were nearly $2 a hundred pounds below the prices of the year before. However, the average price of slaughter cattle in the first eight months of 1929 was 23 cents a hundred pounds higher than in the corresponding period of 1928 and $2.54 a hundred pounds higher than in the corresponding period of 1927.

Though 2.5 per cent fewer cattle were slaughtered during the first eight months of 1929 than in the first eight months of 1928, the gross return to producers was $3,700,000 more, due to higher prices and increased average weights. Returns from calf slaughter have increased from the same causes. Indications are that the total marketings of cattle and calves for the full year 1929 will be somewhat less than in 1928 and will make the smallest total since 1921. Yet the prospect is for an increase in gross returns. During the last year high prices for cattle have attracted larger shipments of dried beef from Argentina and of fresh beef from New Zealand to this country.

Hog Slaughter Smaller

Hog slaughter likewise was smaller during the first eight months of 1929 than in the corresponding period of 1928. The decrease was about 4 per cent. Average weights of the animals slaughtered, however, were considerably higher, and average prices for the period showed an advance of $1.24 a hundred pounds. Hence producers received nearly $81,250,000 more than in 1928. In general the first three-fourths of the year was marked by constancy in supplies and prices. Toward fall, receipts of hogs at public stockyards increased materially, and prices declined. Average prices at Chicago in the middle of September were about $1.70 a hundred pounds lower than

at the July peak, and nearly $3 a hundred pounds lower than in September, 1928.

The foreign demand for pork products has been strong in the last few months because of reduced production in several countries of northern Europe. These countries now show a tendency to increase their hog production. The pork-production cycle of northern Europe tends to coincide with that of the United States. It is therefore probable that American pork in northern European markets will meet increased competition within the next year and a half. Demand for hog products continues strong in the United States as well as in foreign countries. In the United States the strong demand is partly the result of the prevailing high prices for other meats and partly of favorable general business conditions. The demand for lard, however, has been adversely affected of late by the low prices of competing vegetable oils. The outlook for the coming winter and spring is for higher average hog prices than those of the preceding winter and spring. But if producers react as they have done formerly to similar price situations, farrowings next spring will increase. This, together with prospective European increases, will tend to start prices on the downward swing of the cycle during the latter part of 1930.

Record Returns from Sheep

Sheep producers, unlike the producers of cattle and swine, marketed an increased number of animals in the first eight months of 1929, as compared with the number marketed during the corresponding period of the previous year. In that period receipts of sheep and lambs at public markets were 6 per cent greater than in the first eight months of 1928. Federally inspected slaughter increased about 6½ per cent. This increase was happily accompanied by an increase in the gross money return to producers. It is estimated that this increase was nearly $7,000,000, or 7 per cent over the return during the corresponding period of 1928. A high level of beef prices helped to increase the demand for lamb and mutton. Also, the producers' campaign for increased lamb and mutton consumption was apparently effective in increasing the demand for lamb and mutton.

On the whole, the lamb market was steadier than it had been for several years, and marketings and prices followed normal seasonal trends more closely than was the case with either cattle or hogs. However, the increase in lamb and mutton prices which made possible the improvement in gross returns occurred during the first four months of the year. When the new-crop lambs came to market, the earlier price levels could not be maintained. Market supplies of sheep and lambs from April to August were 9 per cent greater than in the corresponding period of 1928, and 33 per cent greater than in the corresponding period of 1924. They constituted a record run for the period. As a result, the average price of sheep and lambs slaughtered in August was $1.15 a hundred pounds under the average price in August, 1928, which decrease was offset by the increased number of sheep and lambs that producers had to sell. Probably the gross returns of the sheep industry for 1929 will exceed those for any previous year in its history.

Wool producers have felt the effect of increased foreign competition recently. In June, 1929, the average price received for wool by the farmers of the United States was 30.2 cents a pound, as compared with 38.7 cents a pound in June, 1928. This decline may be attributed largely to increased wool production in Australia. Many other countries have expanded their sheep and wool production in recent years under the stimulus of satisfactory wool prices. The world wool clip of the past season was probably 5 or 6 per cent greater than that of the previous season. In the United States the number of sheep continued to increase. Production of wool (fleece) this year increased about 1 per cent over the production in 1928, and was estimated at about 302,000,000 pounds; it was 36 per cent greater than the production in 1922. In 10 countries which ordinarily produce a little over two-thirds of the world's output of wool, production in 1928 was estimated at 2,530,000,000 pounds (in the grease), an increase of 6 per cent over the production in the same countries in 1927. Stocks of wool at the beginning of the season at the principal primary markets were considerably higher than at the beginning of the previous season. The number of sheep sheared in 1929 in important wool-producing countries was probably larger than in 1928.

DAIRYING

In general the position of the dairy industry has been favorable this year, though not as markedly so as it was in 1928. Prices of butter, cheese, and other dairy products have not averaged as high as they did last year, largely because dairy production increased generally during the spring and summer months. In the fall, however, dry pastures curtailed production. Consumption during the year held up fairly well as compared with consumption in recent years. In the last eight years, despite a generally upward trend in dairy production, our domestic consumption of dairy products has consistently exceeded our domestic production by about 1 per cent. There is reason to believe that this close adjustment will continue. The dairy industry is very stable. It is not showing any immediate prospect of a marked expansion. Continuance of the stability it has shown in recent years should help the dairy industry to continue as one of the most satisfactory branches of agriculture.

As already noted, our dairy production is slightly less than our consumption, and during the fiscal year 1928–29 our net imports of dairy products were valued at $19,854,000, as compared with $20,392,000 in the previous fiscal year. Our dairy imports, as is usually the case, consisted largely of European varieties of cheese, and of fresh milk and cream from Canada. Our exports of dairy products consisted chiefly of condensed, evaporated, and powdered milk. This country usually imports some butter during the winter and early spring. This period coincides with the peak of dairy production in New Zealand, from which country the bulk of our butter imports come.

It seems probable that foreign competition from this and other sources will increase. From January to August, 1929, foreign butter shipments to Great Britain and Germany, the principal deficit areas of Europe, exceeded those during the corresponding period of 1928 by some 5 per cent, and the corresponding 1928

volume was 10 per cent more than that of 1927. Butter prices in the first eight months of 1929 averaged 10 cents a pound lower in Copenhagen, the principal foreign market, than the prices of corresponding grades of butter in New York. Any further increase in foreign supplies of butter might cause prices in foreign markets to fall to a level that would place foreign butter producers in direct competition with those of the United States. It is worth noting that important technical improvements have recently taken place in the dairy industries of New Zealand and Australia, with very favorable results upon production.

FRUITS AND VEGETABLES

Expansion in the fruit and vegetable industry has been rapid since the war, as is shown by the fact that receipts of fruits and vegetables at 11 large cities have doubled in the last seven years. Increases have been particularly striking in the receipts of some of the annually planted crops, notably lettuce, green peas, snap beans, cauliflower, spinach, carrots, and cantaloupes. Competition resulting from an increased supply of fresh products all the year round is felt very keenly by the canning industry. Accordingly, canners are energetically striving to improve the quality of their output. To that end they are developing methods of buying raw products from the farmers on a quality basis rather than at flat rates per ton or bushel. This method promises increased benefit to both producer and consumer.

Attention has been given by the department to specifications of grades for fruits and vegetables for canning, since the canner's requirements differ from those of the individual consumer. Inspection and grading of fresh tomatoes have been done experimentally at a number of factories, with results that seem to justify further effort. Inspection and grading accompanied by the payment of a premium for deliveries containing a high percentage of No. 1 fruit, mean increased returns for the careful grower and a more profitable output for the canner.

A study of car loadings of fresh products for the general market indicates a marked concentration of surplus production. Carload shipments of head lettuce, celery, cantaloupes, and bunched vegetables originate chiefly in a few well-defined and rather limited areas. Railroad shipments alone, however, no longer give a correct picture of the trade in fresh fruits and vegetables. It is necessary also to consider highway transport. Improved highways and motor transportation are profoundly changing this situation. Though the total volume of perishable farm products shipped by motor vehicles has not yet been measured, studies conducted by the department in certain typical markets and producing districts prove that in many cases the movement by motor far exceeds that by rail. In all producing districts within about 200 miles of large markets the transport of perishables over the highways is increasing rapidly.

Influence of Road Improvement

Road improvement is making nearly all of the farm land in the Eastern States potentially available for truck crops. Fruits and

vegetables may now be grown upon the land best adapted thereto, instead of being confined to land within a few miles of the city market. Thus more economical and more efficient production is insured in this region, and distant truck-growing areas will find it increasingly difficult to invade large eastern markets during the season of local production. Large car-lot shipments will therefore probably continue to be confined to regions that can market fresh products when such crops are not obtainable within possibly 200 miles of the larger consuming centers.

Motor transport affects the marketing of fruits and vegetables in other ways. Some truck operators are itinerant merchants who buy at the farm, for cash, products that formerly went to market for sale on commission. These distributors supply small stores, and sometimes homes, with fresh fruits and vegetables from nearby producing districts or from large distributing centers according to the season.

Irregularity of production continues to be the most disturbing influence in the fruit and vegetable industry. It is constantly threatened by an overproduction of tree fruits. Recent experience indicates that unsatisfactory prices must be expected whenever either citrus fruits or the more important deciduous fruits yield full crops throughout the principal areas of production. This year frosts in April did extensive damage, especially in California, and relatively high prices prevailed for all summer fruits. The demand for melons and other fruit substitutes was stimulated, and growers generally received better rewards than usual. Good returns thus obtained, however, are not necessarily evidence that fundamental conditions are satisfactory.

Speculative financing of annual truck-crop production by men who are primarily distributors continues to be a disturbing influence. Well-established growers may be financed year after year by responsible distributors with advantage to all concerned, if such distributors have wide market contacts. But the tying-up of large tonnages under crop-financing contracts by dealers whose outlets are limited is an unfortunate recent development, which results in unsatisfactory distribution. Often it causes a too rapid movement of ill-standardized products. The department can deal with this situation only by education. An experimental effort to solve the difficulty is in progress in the southeastern early-potato States, with Federal and State agencies and also growers and dealers cooperating.

Increased use of the inspection service of the department, in both domestic and export trade, has been made in the last year. Foreign buyers of tree fruits are more generally demanding Federal inspection. Information services conducted for the fruit and vegetable industries by the department are increasingly in demand, and are being extended. The produce agency act has been vigorously enforced.

POULTRY

Conditions in the poultry industry have been very favorable this year. Producers have received good prices for both poultry and eggs, and their costs of production have not been unusually high.

At present, stocks of eggs are relatively low and supplies of poultry, though probably larger than at this time last year, are not burdensome. Some further increase in poultry supplies is in prospect. The industry is undergoing rapid changes, however; and the penalty for inefficiency is quickly felt. Methods and equipment that were modern only a few years ago may now be almost obsolete. Specialized poultry farms are growing in importance, though farm flocks still produce the greater part of our poultry and egg crop. The trend is toward higher-quality production; and the producer who does not keep up with the times may find his poultry flock a liability rather than an asset.

Specialization is shown not only by an increase in the number and in the average size of the producing units, but also by an increase in the size of farm flocks in many sections, and by better care given to flocks. Turkey raising, after a long decline, shows vigorous new life, gained through the adoption of new rearing methods. In some sections turkey raising is very profitable.

Factors in Recent Development

The mammoth incubator, the commercial baby-chick hatchery, and the coal-stove or oil-stove brooder have been important factors in the recent development of the poultry industry. Producers using these devices can hatch and brood chicks in larger lots with less labor. Recent research has emphasized the necessity of vitamins in the poultry diet and shown how to supply them. New methods make it possible to keep hens producing well in large flocks under relatively close confinement. Electric lights prolong the feeding time in winter, and thus facilitate increased egg production. Methods have been developed by which chicks can be reared to 10 or 12 weeks of age and even longer in batteries of coops under the most confined conditions and with a minimum of labor. In this way the production of out-of-season broilers is simplified and an additional source of income afforded to many specialized poultry enterprises.

But these developments have complicated certain phases of the industry. Large hatcheries utilize the hatching eggs of a group of breeders, while the chicks produced are sold mainly to a different group. It is necessary to safeguard the quality of the poultry stock so handled. Moreover, the use of large incubators increases the risk of spreading disease. Flock and hatchery accreditation has been started in a number of different States to insure better and healthier stock. Considerable differences prevail, however, both in methods and in nomenclature, and some uniform plan is desirable to eliminate the resulting confusion. Changes are in evidence also in the packing and distribution of poultry and eggs. Competition is causing the consolidation of packing and distributing agencies. Cooperative marketing has been a factor in developing this competition. Competition also causes poultry and egg-packing agencies, both private and cooperative, to furnish service in an increasing degree to patrons or members. The demand for finer and better standardized products spreads the practice of buying eggs on a graded basis, to the great advantage of producers.

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AGRICULTURAL CONDITIONS IMPROVING

Agricultural conditions in the United States continue gradually to improve. Farm incomes in the crop season 1928–29 averaged higher than those of any season since 1920–21 except 1925–26. The movement of population from the country to the town declined, and the rate of depreciation in farm-land values declined also. This is evidence of improvement in basic conditions. Much further improvement will be necessary before the situation can be considered satisfactory. Since the war agriculture has suffered grave disabilities which the farmers by their own efforts have not been able to remove. In consequence, they are still overburdened with debt. As of January 1, 1928, farm mortgage debt in the United States was estimated at $9,468,526,000, as compared with estimated totals of $9,360,620,000 as of January 1, 1925, and $7,857,700,000 as of January 1, 1920. On the other hand, the farm bankruptcy rate was considerably lower in 1928 than in any year since 1922.

The position of agriculture in general at the close of the crop season 1928–29 was better than at the close of the preceding year, and there are prospects of continued improvement. The crop season 1929–30 began with a rising farm-commodity price level, and with only moderate supplies of the principal products in prospect. These circumstances, joined to the expectation that benefit will accrue to agriculture from the operation of the Federal Farm Board under the new agricultural-marketing act, warrant confidence that better times are in store.

Aggregate gross income from agricultural production in the United States for the crop season 1928–29 is estimated to have been $12,527,000,000. This was about $225,000,000 more than the aggregate gross income of the preceding year. Cash income from the sale of farm products is estimated to have totaled $9,949,000,000, or an increase of $79,000,000 over the corresponding figure for 1927–28. Net income of the farmers did not increase proportionately because farm operating costs, taxes, and interest on debts advanced somewhat. The income available for living on the farm, including the value of the farm products used by farm families, was only about $16,000,000 greater than in the previous season. The return earned on the current valuation of agricultural property was about the same, namely 4.7 per cent, compared with 3.1 per cent in 1922–23 and 1.4 per cent in 1921–22.

Livestock Enterprises the Most Profitable

Higher prices for livestock and livestock products were the principal cause of the improvement in the season's agricultural income. Increased unit prices more than offset a reduction in the volume of cattle, hog, and lamb sales. Income from meat animals was $145,000,000 more than in 1927–28, and income from dairy and poultry products was more than $200,000,000 greater. Income from grains and fruits and vegetables, on the other hand, was smaller. Reduction in the income from wheat and from potatoes was particularly marked, the markets for these products being oversupplied. The outlook for the present season is in sharp contrast in some respects with the results of last year. This season a short world wheat crop has

raised the price of wheat, and a short potato crop in the United States promises increased returns from that crop. The expectation of an increased aggregate income for agriculture rests primarily on the improved position of grains and fruits and vegetables. Indications are that the income from livestock may be little or no greater than it was in 1928–29.

In August the prices received by farmers for their principal products averaged 143 per cent of the pre-war level, compared with 139 per cent in August, 1928. It seems probable that the average level of prices for the 1929–30 season will be fairly close to the August average. This average may be compared with the corresponding figure for 1921–22, when the average farm-commodity price level was only 119 per cent of the pre-war average, while the price level of the commodities usually bought by farmers was more than 150 per cent of the pre-war level. In the last few years the prices of the commodities usually bought by farmers have not advanced but have remained in the neighborhood of 156 per cent of the pre-war level. In other words, the exchange value, or the purchasing power of farm commodities, has improved. In the calendar year 1928, for example, the prices received by farmers per unit of their principal products would buy about 90 per cent as much as the corresponding prices of the pre-war period. This purchasing-power ratio was 15 per cent higher than the corresponding figure for 1921.

Meaning of the Purchasing-Power Index

Improvement in the purchasing power of farm commodities, however, is not necessarily synonymous with an improvement in the purchasing power of the farmer. Since the farmer's purchasing power depends on the quantity of the commodities he has to sell as well as on their relative unit price, the purchasing-power ratios here quoted must not be overestimated as an index of agricultural prosperity. They are valuable in comparing one year with another; but a true measure of agricultural conditions necessitates taking many other things into the reckoning. Final proof of agricultural improvement must rest, not on price comparisons alone, but on evidence that the margin between total costs of production and total prices received is increasing. Only when the farmer's net income increases more than the prices of the things he must buy does he obtain an increase in purchasing power. In the last few years a substantial gain of this character has actually taken place. But the crop year 1928–29 saw more improvement in the gross farm income and in the price situation than it saw in the net income of the farmers, because of increased costs, including higher taxes.

The fact should not be overlooked, however, that a diminution in net farm income which may be due to an increase in taxes does not necessarily mean an impairment of the rural standard of living in general. Funds raised by taxation are in the main expended for local purposes, such as schools and roads and other community facilities. With economical use of funds, this may add as much to the general standard of comfort in the community as would have been added had individual farmers spent the money themselves instead of paying it out in taxes.

Agricultural Property Valuations

In the last two seasons the current value of agricultural property has increased. Land values in the season 1928–29 declined slightly, but the value of personal property, including livestock on the farm, increased sufficiently to raise the estimated current value of agricultural real estate and personal property to $58,645,000,000. This was an increase for the year of nearly $400,000,000. In view of the drastic decline that took place in agricultural values in the early years of the depression period, this recovery seems very modest. That decline was due to financial deflation and to depreciation in the earning power of agriculture. While the recent gain seems small, it is encouraging. The advance has been largely due to a rise in the value of livestock on the farm, and an increase in livestock production may mean a lower valuation for this item. On the other hand, continued improvement in farm incomes should strengthen the upward trend by stimulating activity in farm real estate.

FARM-LAND VALUES

Farm-land values have developed encouraging tendencies. As is well known, the general movement has been downward since 1920. While it is not yet possible to record a uniform change from the general downward movement, the latest data available indicate that farm real estate values have been appreciably nearer stability during the last year and a half than at any time since the downward movement began.

A survey made by the department for the 12 months ended March 1, 1929, showed that for the country as a whole farm-land values declined by 1 per cent. This was the smallest loss in any year since the postwar depression began and was nominal compared with the declines of 1921, 1922, 1923, and 1924. State and regional averages as a rule showed few of the sharp declines frequently recorded in the years immediately preceding. In the North Central States, for example, the year's decreases did not exceed the national average of 1 per cent. Values in the Southern States likewise declined only slightly during the 12-month period in question. In the Mountain States and the Pacific Coast States values held up well toward the previous year's level, and in a few States, including Montana, Wyoming, Arizona, and New Mexico, a slight upward tendency was manifest.

Current changes in farm-realty values are of course largely an outgrowth of economic disturbances caused by the war. In the postwar "boom" farm real-estate values for the United States as a whole rose to a level averaging 70 per cent above the pre-war level. Then followed a drastic decline to a present level 16 per cent above the pre-war average. Thus for the country as a whole, up to March 1, 1929, more than three-fourths of the war-time gain over pre-war levels had been canceled. In some States the drop considerably exceeded the national average and carried average values to pre-war levels or below. These percentages, moreover, make no allowance for the changes in the value of the dollar. When allowance is made for the decline that has taken place in the purchasing power of the

dollar during the last 14 years, it appears that farm real-estate values for the United States as a whole on March 1, 1929, were 20 per cent lower than in March, 1914. In other words, an acre of land that in 1914 could have been exchanged for 100 commodity units would have brought only 80 such units in March last.

Forced Sales and Related Defaults

Forced sales and related defaults in connection with farm land decreased during the 12 months ended March 1, 1929. In that period the rate of forced sales and related defaults was approximately 19 farms per 1,000 farms, as compared with 22 and 23 farms per 1,000 in preceding years. Much improvement is necessary to restore normal conditions. The foreclosure rate is still very high, and the farm bankruptcy rate is seven times the pre-war figure. On the other hand, the transfer of farms by voluntary purchase or sale is far below normal. As a result, much land is held by mortgagees under conditions which seem likely to make it a problem for some time. It is unfortunately still true that in discussing the farm real estate situation we must record improvement in terms of lessened damage rather than in terms of positive gain. Nevertheless, the situation is clearing, and it may shortly be possible to exchange negative for positive terms in describing developments.

It is desirable to guard against a tendency, often shown heretofore, for farm real estate values to be bid out of a reasonable relationship to the farm earnings that can be conservatively expected. In the postwar boom period 6 per cent mortgages on land yielding not more than 3 per cent on their capitalization were not uncommon. Farms thus overcapitalized carried a heavy burden of charges, and had an insufficient margin of safety when farm earnings declined. Under such conditions farm ownership tended to lose its appeal, for tenancy was often more profitable.

Overoptimism in farm-land valuations tends, since the error must eventually be corrected, to be followed by a period of undue pessimism, during which values are driven below the level justified by earnings. Credit may then be unduly restricted. In the first case, easy credit causes prices to be bid up excessively, while in the second case restricted credit causes prices to fall too low. More study of the factors that ultimately determine farm-land values is required, so that the farm realty market will be less influenced by uninformed opinion. Fundamental research combined with accurate and continuous current information should help to discover the basis upon which farm-land values should be stabilized.

Necessity of Sound Capitalization

Agriculture can not be continuously prosperous unless the structure of its capitalization is sound. Mistakes in this field may largely offset the value of efficient farm management, good adjustment of production to demand, orderly marketing, and intelligent use of land resources. Adequate research and analysis of the farm-land-value situation would have disclosed some of the weaknesses that came to light after the war, and served as a useful warning against inflation

Though farm valuations are not inflated to-day, they may again become so if precautions are not taken. Adequate research is the first necessity. The department is engaged in studies as comprehensive as its resources for the work permit.

USE OF POWER MACHINERY

In recent years a rapid technical evolution has taken place in American agriculture, characterized distinctively by a substitution of mechanical power for human and animal labor. Most of the change has developed since the European war. Comparisons limited to the postwar period are not available. Some idea of the magnitude of the change can be gained, however, from the fact that between 1870 and 1925 the average area of improved land cultivated per farm worker increased from 32 to 49 acres, or slightly more than 50 per cent. In the same period the value of machinery on farms in terms of 1913 dollars increased tenfold, or from $270,000,000 to $2,700,000,000. In value of machinery per farm worker, in terms of 1913 dollars, the increase was from $36 in 1870 to $200 in 1925, a gain of 455 per cent. American farm workers using mechanical power now produce from two to five times as much as similar workers in the older countries of Europe. Though all parts of the country have been affected more or less by this technical progress, the western grain-growing areas have been affected most. Mechanical power is rapidly replacing horsepower in heavy work such as plowing and disking in all parts of the country, and in the last few years machinery has become important for cultivating row crops and for grain harvesting.

The introduction of tractors suitable for cultivating corn, cotton, and potatoes is comparatively recent. Previously the standard method of cultivating corn was with the 2-horse, 1-row cultivator. Under the old conditions one man could cultivate from 30 to 50 acres of corn, according to the topography and the character of the soil. With one of the new power cultivators equipped for 4-row cultivation, one man can cultivate from 160 to 200 acres of corn. In the same manner he can cultivate about the same acreage of cotton. This gain in the acreage one man can cultivate tends to increase the size of farms in the central Corn Belt and in the western part of the Cotton Belt. It materially reduces unit costs of production. Following the introduction of the tractor-cultivator the number of horses needed on corn and cotton farms decreased sharply. From 1918 to 1928 the number of farm horses in the United States decreased more than 7,000,000 head. Simultaneously the automobile and the truck practically replaced horses in cities. There resulted a marked decrease in the demand for corn, oats, and hay. However, the decrease in the demand for corn for horse feed was partly offset by a slight reduction in the acreage of corn and by increases in other kinds of farm stock.

The Increase in Tractors

An indication of the rapidly growing use of mechanical power on farms is the increase in the number of tractors manufactured in this country. In 1917 the number produced was 62,742. Though this

was double the production of 1916, it was less than half the number turned out in 1918. It is estimated that in 1928 there were approximately 853,000 tractors on American farms. Tractors have recently been greatly improved in design and construction. The early farm tractors were large and proved unwieldy on land already under cultivation. Then followed a reaction toward very small tractors. To-day a middle course is followed; the tractors now turned out are somewhat larger than those that were popular a few years ago. In the northern Great Plains region the 3-plow and 4-plow tractor is coming rapidly into use, and there is some demand for 6-plow tractors.

More strongly built implements to hitch to these tractors are required. Manufacturers have been cautious about producing such equipment, fearing that their necessarily higher price might interfere with sales. It is now coming to be recognized, however, that the great power of the modern tractor necessitates strongly built attachments. A typical example of the labor-saving effected by the use of the tractor is given in a recent study made by the University of Arkansas, which showed that a rice farmer in that State using tractor equipment could accomplish three, four, and even five times as much as he could with earlier methods. In one rice-growing county in Arkansas the survey showed 1,507 tractors, or 1 for every 63 acres of rice.

In many western localities farmers have increased the size of their implements, and the area of land they till, by using large teams. This is practicable through the use of hitches that compel each unit of the team to do its share of the work. Teams of 12 to 20 horses are not uncommon for plowing, disking, harrowing, and seeding, and on some of the combines in the Pacific Northwestern States as many as 32 horses are used effectively. A contest is on between the tractor and the big team, the outcome of which is not yet determined in many localities.

Trend Toward Larger Farms

Large power units of farm equipment are undoubtedly the chief cause of the recently accelerated trend toward an increase in the size of farms. It has been estimated that from 1915 to 1917 Montana had about 35,000 wheat farmers, many of them operating half-section or small farms. To-day Montana probably has not more than 14,000 wheat farmers. These men, however, are handling more acres and doing the work better than it was formerly done by 35,000 farmers. New types of implements for cultivating summer fallow have helped to increase the size of farms in the Plains and in the Mountain States of the West. One of these implements is called the "duckfoot." Use of the duckfoot first became general in the Columbia River Basin, and spread therefrom to Montana and other States east of the Rockies. Some wheat growers in the State of Washington substitute this implement for the plow. One farmer in that State, using 16-horse teams on 12-foot duckfoot cultivators as a substitute for plows, is able to farm 1,600 acres per man. Another new implement that is gaining in popularity in the central and northern Plains region is the 1-way disk summer-fallow cultivator, which permits a more effective cultivation and results in better yields.

Outstanding in postwar mechanical developments in agriculture is the rise of the combined harvester-thresher (known everywhere among farmers as the "combine"), in the territory east of the Rockies, where it was formerly believed that wheat could not be left standing until ripe enough to be harvested by the combine. When the practicability of the new method of harvesting was demonstrated for the Plains region, the introduction of the combine was extremely rapid. In 1926, 30 per cent of the Kansas wheat crop was harvested by the combine, 8,274 machines being used in the work. In 1928 Kansas had 20,000 combines. The combine appeared in North Dakota for the first time in 1925. Three years later in that State 1,000 combines were used in small-grain harvesting.

Wheat Harvesting by "Combine"

This year more than half of our hard winter wheat, one-fifth of our hard spring wheat, and a smaller proportion of our soft winter wheat was harvested by combines. This machine eliminates the grain binder, the shocking of the wheat, stacking, and the use of the threshing machine. It reduces the cost of harvesting to a small fraction of what it formerly was. A serious problem connected with the use of the combine is the fact that much combined grain contains more moisture than grain may safely contain when put in a bin. Accordingly, means are being studied whereby the moisture content of grain may be reduced before it is placed in storage. Indications are that a solution of this problem will be found.

Increased use of automobiles and trucks for road work has greatly extended the market area available to farmers. In 1926 farmers on the eastern shore of Maryland and Virginia moved 1,162 carloads of strawberries by truck. Some of the shipments went as far north as Albany, N. Y., and Boston, Mass. Grapes from Michigan are to-day moved as far as Indianapolis, Ind. In some instances hauling by automobile and truck saves two-thirds of the farmer's time in delivering his products. A recent study showed that before the introduction of trucks the market points used by a certain group of farmers averaged 7 miles from the farm. After the introduction of trucks the average distance to market points was 18 miles.

Cincinnati, Indianapolis, Detroit, Milwaukee, Minneapolis, and St. Paul receive 90 per cent of their milk supply by motor truck. Receipts of hogs, cattle, calves, and sheep by truck have increased at most of the large livestock markets. In 1928 more than 50 per cent of the hogs received at Indianapolis, Oklahoma City, and Sioux City, and an equal proportion of the cattle received at Indianapolis, the calves received at St. Joseph, and the sheep received at Indianapolis, Louisville, and Oklahoma City arrived by other means than rail transportation, mostly by truck. At Chicago, the percentage, while increasing, has remained negligible. In the last five years the number of Illinois hogs marketed by truck has risen from 7.9 to 22.5 per cent of the total marketed. This change has been accompanied by an increase in the percentage of all hogs moving directly from farm to packing plant. Fourteen per cent of the fruits and vegetables grown on the Delaware-Maryland-Virginia Peninsula, including

more than half of the more perishable commodities, such as strawberries, peaches, and cucumbers left that area by motor truck in 1928. Fourteen per cent of the receipts of fruits and vegetables at Newark during 1928, at least 5 per cent of those at San Francisco, and at least 9 per cent of those at Boston, arrived by truck. Perishable commodities produced within 200 miles of their market seem to offer the principal field for truck movement.

FARM RELIEF

Outstanding among the events of 1929 was the passage of the agricultural marketing act. This measure, the result of eight years of discussion in the press, in agricultural circles, and in Congress, is essentially intended to enable agriculture to effect a better adjustment of production to demand and a more efficient system of marketing. Its adoption closed a period of debate and opened one of action. Though opinion was sharply divided during the preparation of the law, its enactment was hailed with general approval and satisfaction.

This is not the place for a detailed analysis of the agricultural marketing act, nor for any forecast of its results. In view of the importance of the measure to agriculture and to the Nation, however, it seems appropriate to mention its principal provisions and to note some of the conditions with which it must deal. It sets up a Federal Farm Board with unusual powers and resources. It contemplates that rural prosperity may be increased by the creation of a new agency to function parallel with other governmental establishments in the furtherance of a broad and constructive program for agriculture.

The program as set forth in the agricultural marketing act contemplates: (1) Strengthening the bargaining power of producers and increasing the efficiency of their marketing operations through the development of effective cooperative-selling associations, stabilization corporations, and clearing houses; (2) stabilizing the supply of agricultural products and minimizing fluctuations in prices by preventing surplus production in so far as possible, and by effective distribution of surpluses once produced; (3) assisting in developing a national agricultural policy with reference to land utilization, marginal lands, and, in general, the control of the farm-land area; (4) assisting in broadening markets for agricultural products at home and abroad and, more specifically, through the development of by-products of and new uses for agricultural commodities; (5) helping to correct maladjustments in transportation conditions that work hardships on agricultural producers in any section of the country; and (6) assisting in minimizing undesirable speculation in agricultural commodities and eliminating waste in their distribution.

In short, while in the act itself stress is laid upon the effective organization of cooperative-marketing associations as a means of improving farm conditions, it is apparent that Congress contemplated a broad approach to the problem, embracing all major economic factors that materially influence farm incomes.

Act Is Specific as to Methods

The agricultural marketing act is specific regarding the methods which it is expected the Federal Farm Board will use in furthering this program. It directs that education in the principles and practices of cooperative marketing of agricultural products be energetically promoted. It also directs the board to promote the organization and development of effective cooperative-marketing associations. It contemplates that where conditions require such action, the board will assist in the organization of stabilization corporations and clearing houses to assist in tempering the influence of abnormal surpluses upon prices. It provides for far-reaching financial assistance to cooperative-marketing associations and, for this purpose, authorizes a revolving fund of $500,000,000. It contemplates that the board will utilize the services and the results of research of other organizations in the development of its program.

In creating this new agency Congress evidently intended that it should not supersede the Department of Agriculture and other existing agencies, but should coordinate its activities with those agencies. Close cooperation between the Federal Farm Board and the Department of Agriculture is necessary. The terms of the agricultural marketing act show that Congress did not intend to create a new Federal agency with duties overlapping those of this department. Such a course would weaken one or both organizations. But the board is clearly expected to supplement some of the department's work. In the great task of reorganizing agriculture in many important respects, the board will be on the firing line while this department will, to a large extent, make and supply ammunition. As an organization for research and for service to agriculture and for the enforcement of regulatory laws, the department will continue to function as it has done in the past. It is not the suitable agency to make practical application of all the facts its investigations bring to light, nor has it the legal authority to do so. In this field the board can do what the department can not do.

Opportunity for Cooperation

Every opportunity exists, therefore, for harmonious and fruitful cooperation between these two Federal agencies. The department's crop and livestock reporting services, its market-news and outlook reports, its work on grading and standardization, and its studies of agricultural prices, cooperation, land utilization, and other agricultural matters, will undoubtedly be of great assistance to the board. Doubtless also the board will call upon the department for special research and service work. Agricultural investigations and services are all interrelated. It is therefore not improbable that the department will be called on to assist the board in many ways related to the immediate and the long-time purposes of the agricultural marketing act.

By a curious coincidence the agricultural situation, when the Federal Farm Board began its work, was unusually free from difficulties due to surplus production. It need scarcely be said, however, that surpluses will recur. Wise planning may establish a better average balance between production and supply, but can not wholly obviate

the effect of exceptionally favorable weather on production. Seasonal surpluses will be produced inevitably from time to time. The great task of the Federal Farm Board is to assist agriculture in making surpluses less frequent, less burdensome, and easier to handle.

Much more is required than merely the financing of cooperative associations. This is clear from a glance at the many reports that have been made in recent years on the condition of American agriculture by public and independent agencies. Among these may be cited a report in 1926 by the National Industrial Conference Board, and another in the same year by an advisory committee of the Social Service Council; a report in 1927 by a special committee of the Association of Land Grant Colleges and Universities; a report prepared in 1927 by a business men's commission acting under the joint auspices of the Chamber of Commerce of the United States and the National Industrial Conference Board; and a report in August, 1928, by a special committee of the United States Chamber of Commerce.

Though naturally varying in their emphasis on different aspects of the agricultural problem, these reports had much in common. They drew attention to the results of the world-wide economic disturbances occasioned by the war, to the long-time effects of unwise land utilization, to the seasonal effects of wrongly planned acreage and livestock breeding, to the wastes of unregulated competition and haphazard marketing, and to the hardships sometimes imposed on agriculture by an inadequate credit system. Evils thus deeply rooted can not be remedied overnight. Nevertheless, I think we may say that the machinery set up under the agricultural marketing act promises a more effective and continuous remedy than has heretofore been possible.

Status of Cooperatives

In view of the important functions assigned to the cooperative associations in the Federal Farm Board's program, it will be useful to glance at the status of the American cooperative movement. What cooperative machinery lies ready to the board's hand? What foundation has been laid for future building? It is satisfying to report that the current year has seen good progress in cooperative marketing, in general efficiency as well as in membership and in business done. Increased attention has been given to the development of large-scale organizations, to the centralization of sales, and to the possibilities of regional federation. In recent years membership in cooperative associations and their volume of business have increased more rapidly than the number of associations. In other words, the cooperative units have become larger. This tendency, which promises to continue, lessens selling competition and facilitates efficient distribution. It is in line with the Federal Farm Board's expressed desire that cooperative development shall be effected primarily through a strengthening and a closer integration of existing associations, rather than by causing a new crop of associations to spring up.

The first cooperative associations in this country were local bodies formed to provide better and cheaper marketing facilities. In some areas these developed into regional organizations. Eventually asso-

ciations were set up for cooperative selling in the terminal livestock and grain markets. Livestock cooperative agencies now operate in 26 important livestock markets, 12 of them in affiliation with the National Producers' Livestock Marketing Association, and 9 with Farmers Union organizations. The others are independent. Some progress has been made toward the centralization of grain marketing, though in this field differences of opinion as to methods have not yet been settled. Hence, centralized grain marketing is in a relatively early stage. Large federations of cooperative creameries and cheese factories have been developed through the federation of independent local units. Numerous large dairy cooperative associations are affiliated in a national body. In fact, the last four or five years have seen a very strong trend toward an increase in the size of cooperative units and a disposition among them to federate for coordinated marketing. One striking index of the present status of the American cooperative movement may be seen in the fact that more than 200 farmer-owned associations now each transact an annual business exceeding $1,000,000.

Units Largely Unrelated

Nevertheless, the movement is still made up largely of unrelated units that inevitably work to some extent at cross-purposes. More than 90 per cent of the associations now functioning are independent local or regional bodies having little contact with other cooperatives. More than 300 associations market potatoes. There are 6 or 7 large organizations that handle from 1,500 to 8,000 cars annually, but this represents only a fraction of our potato production. As a result, potato selling is highly competitive, and little progress has been made in adjusting the production of potatoes to the probable demand. Efforts toward coordinated production and marketing in one region tend to be nullified by unregulated production and haphazard marketing elsewhere. The same condition exists in many other branches of agriculture. Centralized organizations for coordinated marketing are indispensable if full advantage is to be taken of the agricultural marketing act.

Under the agricultural marketing act rapid progress in the coordination of cooperative marketing may be expected, inasmuch as greater unity of effort among producers' organizations is a leading object of the act. Support is not to be given to the upbuilding of unrelated cooperative units in the same branch of agriculture, since to do so would increase wasteful competition in marketing between producing groups and between producing regions. Thinking in local or regional terms, necessary in the early stages of the cooperative movement, must now be supplemented by thinking in commodity terms. Such a view of cooperative requirements is entirely consistent with the continued growth of local and regional associations, provided these become units in a coordinated movement. Time will be required to work out the necessary details of this principle. But when it is applied, an important step will have been taken toward placing agriculture on a parity from a business standpoint with other industries.

FARM TAXATION

Taxes on farm property continued to increase slightly during the past year. For the country as a whole the increase amounted to about 1½ per cent. In the east North Central States there was a slight decline; taxes in the Middle Atlantic and the Mountain States remained at the level of the previous year. In all other sections increases occurred. The normal tendency of public expenditures is to increase. Hence reduction in farm taxes is not usually to be sought through general reductions in public expenditure, but rather through readjustments tending to equalize tax burdens among all tax-paying groups.

Farm taxation mainly concerns State and local governmental units rather than the Federal Government. Accordingly, the department's studies of the problem are largely conducted in cooperation with research organizations in the several States. Research results brought together within the past year indicate that during the last five years taxes have taken about one-third of the net rent on rented farms. This fact gives some idea of the tax burden on all farm property. Detailed studies in 14 States extending from New Jersey to Washington and as far south as South Carolina provided the basis for this estimate. It is estimated that in 1928 farmers paid $1.42 in taxes on each $100 of actual value of their real estate. This ratio should not be confused with the tax rate, which because of the general custom of underassessing all property would average much higher.

Chief among the reasons for the excessive weight of farm taxation are the dependence of local governmental finance on the general-property tax, and the fact that farmers, more than any other group, have their productive property in a form that can not be missed by the assessor. State governments are making increasing use of sources other than general property from which to secure revenue, but little use is made of such sources by local governmental units.

Broadening Assessment Basis

Changes in taxation that broaden the assessment basis of the general-property tax or that use reasonable indices of tax-paying ability other than the ownership of tangible property can not fail to be of advantage to farmers. Along with or perhaps in advance of such changes must go improvement in the administration of the tax laws. The averages that have been quoted do not indicate the great differences that exist in the weight of taxes from farm to farm. When taxes were light, inequality in their incidence was of minor importance. Even the persons most highly taxed were not taxed so heavily as to feel injured. Injustice existed, but did not make itself acutely evident. Now, however, many persons in the group that is taxed materially above the average find their tax burden unbearable.

Recent studies in a Western State indicated that, because of inequalities in assessment, owners of half the real estate paid two-thirds of the taxes. This condition existed in the State as a whole and to a greater or less degree in its local administrative units.

Studies in other States showed similar conditions. Improved assessment would lower the taxes of many now unfairly burdened. It would necessarily increase the taxes of persons now assessed on a basis lower than the average, but the result would be more equitable than is the present situation. Improved assessment would also put on the tax roll property that heretofore has escaped taxation. Since the property added would be mainly nonagricultural, the burden on farm property would be lowered. In many parts of the country improvement is possible in the collection as well as in the assessment of taxes.

No single program of tax reform could be devised to fit all the States. It is worth noting, however, that State taxes on personal income are being increasingly used to raise revenue. In some States a low-rate tax on intangibles has materially increased the revenue secured from intangible property. The sales tax on gasoline is universal and yields much revenue and State sales taxes on nonessential commodities make a small contribution. Severance taxes, levied when a natural resource is used up, yield large revenues in certain States that have mineral resources. By adopting one or more of these taxes a State may relieve tangible property measurably.

Increased State Aid for Roads and Schools

Increased State aid in the building and maintenance of roads and in paying the costs of education is broadening the tax basis for the support of these public services in some States. Few States, however, have gone as far as they might in assisting in this way their communities of relatively low tax-paying ability. Such communities, which are often farming regions, are usually forced by State laws to maintain high standards of education. The State should accept the responsibility of helping to maintain such standards, when the burden on local property exceeds certain limits. Much of the desired improvement in the farm-tax situation can come only through the action of the community as a whole. It is necessary to consider not only farm taxes, but the use that is made of the proceeds. Sometimes public expenditures may advantageously be increased. For effective tax reform, this fact must be borne in mind, as well as all pertinent facts relating to tax burdens.

FARM CREDIT

Farm credit remains costly in many parts of the United States notwithstanding the great improvement that has been made in agricultural-credit facilities during the last 10 or 15 years. The Federal reserve act of 1913, the farm loan act of 1916, and the intermediate credit act of 1923 brought about favorable changes of fundamental importance. Further progress may be expected from the financial provisions of the agricultural marketing act of 1929. As yet, however, the potentialities of our credit system are reflected very imperfectly in the terms and conditions under which many farmers obtain credit. In many instances the gap between the supply of credit at central money markets and the farmers' credit requirements has not yet been bridged. In the case of production and marketing credit, local facilities through which the farmer can avail himself

of the credit channels established by the Federal reserve and the intermediate credit acts are too often lacking. In the case of mortgage credit the facilities are generally within the farmer's reach, but want of knowledge concerning them frequently prevents their use. In parts of the South, for example, a substantial proportion of the credit used by the farmers is obtained by them from merchants rather than from credit institutions. It takes the form of time payments for goods purchased. A study made by the department in the Southeastern States showed that the cost of such credit averaged more than 25 per cent per annum. Credit for fertilizer obtained on this plan generally costs about 35 per cent. Farmers having both merchant credit and bank credit paid from two to four times as much for the former as for the latter. Average credit costs for all the short-term agricultural credit used, including cash credit from banks, ran from 10 to 15 per cent. Even land mortgages on good security often carried 8 to 10 per cent interest, although the rate charged by the Federal farm loan system was less than 6 per cent. Frequently the cost of loans was out of all reasonable proportion to the risk.

Financial Isolation of Farm Communities

The financial isolation of farm communities has much to do with the relatively high cost of agricultural credit. Such isolation permits a wide range of charges, and great fluctuations in the local supply of credit. Commercial banks, the most important source of short-term credit for agriculture, are too numerous and too small in some areas. This is a more or less inevitable outgrowth of competition for the loan business and of trying to bring credit facilities within convenient reach of all prospective borrowers. The situation has been modified but not yet corrected by improved transportation. Country banks usually concentrate their loans in very restricted areas, with a corresponding concentration of risks. As a result, both local and nation-wide agricultural depressions speedily exhaust their resources. As is well known, country-bank failures have been exceedingly numerous in recent years. These institutions were subjected to severe strain as a result of war-time inflation followed by monetary deflation and by depression of agricultural values. The situation in local banking is improving as a result of economic progress in agriculture generally and because of better management of banks and a strengthening here and there in State laws.

Improvement is not so much a question of providing new credit institutions as of improving the functioning of those in existence. Much might be accomplished on the initiative of the lending institutions themselves. Such institutions, particularly in regions where crop specialization is the rule, often fail to see the need and wisdom of making loans for side-line enterprises, such as dairying or livestock raising. Hence the farmers' demands for such credit often go unsatisfied. In regions where such enterprises are relatively undeveloped, they may afford a profitable opportunity for utilizing labor time that would otherwise be lost. Credit institutions are often slow to recognize new opportunities created by improved machinery and by technical progress generally for the profitable use of credit in agriculture. A more progressive attitude on the part of such in-

stitutions would enable many farmers to increase their income substantially.

Farmers themselves, of course, can help toward the improvement of the credit situation. As individuals they can do so by observing sound principles in the use of credit. During a period of high money rates, for example, it is obviously desirable, whenever possible, to defer mortgage financing. It is also desirable that more farmers should recognize the advantage of obtaining a greater proportion of their necessary credit from specialized credit institutions, rather than from merchants who ought not to be asked to do a banking business. Study of market prospects, before applying for production loans, will help the individual farmer to improve the general credit situation. Collectively, farmers have very extensive opportunities for bringing about improvement. Since the intermediate credit act was passed large amounts of credit have been utilized successfully by the cooperative associations.

Their field of opportunity is widened by the enactment of the new agricultural marketing act, which provides for loans to cooperative associations for the acquisition of plant and equipment. It thus meets an urgent need. This act also provides for loans to assist in the formation of clearing-house associations and in the extension of cooperative membership. Loans made available for these purposes will constitute an addition to the existing farm-credit structure, rather than a substitute for any part of it and are, therefore, a distinctly new and important contribution to the solution of the farm-credit problem. Commodity loans which the Federal Farm Board is authorized to grant, supplementing loans from existing agencies, should be conspicuously serviceable in relieving farmers from compulsion to market their crops at harvest time regardless of price conditions.

Field for State Action

In the improvement of agricultural credit, there is a broad field for action by the several States. Most banks that serve farmers operate under State supervision. Improved banking laws are needed in many States. It is necessary to insure increased safety for deposits, as well as to improve credit facilities and credit practice. Some States maintain legal restrictions on interest rates that really make credit dearer. When legal rates are lower than those quoted in central markets for loans with a favorable term and good security the flow of credit into the community is diminished and loanable funds within the community tend to be diverted into outside investments. With resulting scarcity of local credit, farmers may thus be forced to resort to costly merchant credit. Regulations that attempt to set aside economic laws need to be replaced with more practical ones, in harmony with the principles of money and banking and at the same time properly adapted to agricultural requirements.

MOVEMENTS OF POPULATION

Evidence that the drift of population from the country to the town continues is contained in a survey made by this department covering 1928. Our farm population at the end of 1928, according

to this estimate, was the smallest in more than 20 years. Though the gross movement of persons from the farms was somewhat smaller in 1928 than in 1927 and 1926, it comprised the formidable total of 1,960,000 persons. This figure was largely offset, however, by the movement of 1,362,000 persons from cities, leaving a net movement of 598,000 persons from the farms to the cities. The corresponding net movement for 1927 was 604,000 persons; for 1926, 1,020,000; for 1925, 834,000; for 1924, 679,000; for 1922, 1,120,000. No estimate was made for 1923. Farm population as of January 1, 1929, was estimated at 27,511,000, as compared with 32,076,960 as estimated by the census for January 1, 1910.

In these cross currents of population, the net movement from the farms to the cities is not synonymous with the net annual loss of farm population. This latter figure must be calculated after allowing for birth and death rates. A birth rate much higher than the death rate on farms makes the net annual loss of population much less than the annual migration figures would suggest. Thus in 1928, the net loss of farm population, with allowance made for birth and mortality on the farm, was estimated at 188,000 persons, as compared with 193,000 in 1927, 649,000 in 1926, 441,000 in 1925, and a total of 2,000,000 in the years 1920 to 1925.

Loss of population in the country due to townward migration has taken place in parts of the United States for many decades. Though the postwar depression increased the loss, it did not account for it wholly. Technical progress on the farm, as a result of which it becomes possible to feed an increasing population with less farm labor, has much to do with the phenomenon. Farming processes in the United States have been mechanized at an extraordinary rate since the war. This progress, with its associated labor-saving, was not sufficiently offset by an increase in the demand for farm products. By an inevitable necessity, therefore, the farm population declined. Since the net loss has declined quite steadily in the last few years, the exceptional forces responsible for the extraordinarily heavy postwar movement appear to be losing momentum.

The Probable Trend

Future movements of population from the country to the town will be influenced by the degree of prosperity prevailing in agriculture, by the rate at which machinery is substituted for human labor, by further developments of scientific production, and by the growth of markets at home and abroad. In all probability the balance between urban and farm population will continue to run in favor of the towns. Our concern is, however, that the movement of population, at whatever rate it may take place, shall be in harmony with the Nation's social and economic advance. When it is too great, as it may possibly have been in some years recently, the agricultural industry is deprived of necessary man power, and compensating adjustments are made necessary at great national expense. When the movement is too small, competition in agriculture rises to a point at which farm profits tend to disappear. Some evidence exists that the population movement is approaching stabilization on a basis consistent with the national good, and that necessary

changes in population elements will be brought about rapidly enough to avoid hardship and distress.

FARM LIVING STANDARDS

In the last eight years the department has accumulated considerable data on family-living standards on the farm. Though sufficient progress has not been made to permit a thoroughgoing comparison between farm standards and city standards, much has been learned about the living standards of certain groups of farmers. It has been demonstrated, for example, that family-living standards are deficient on a large proportion of the small farms in the country. That is an important fact necessitating remedial action, for small farms are relatively more numerous than is commonly supposed. In 1925, when the average number of acres per farm in the United States was 145, 38 per cent of all the farms were under 50 acres and 60 per cent were under 100 acres.

Family-living standards are of course not low on all small farms. Many small farms devoted to varying types of agriculture produce net incomes equal to the average on larger places. It is nevertheless true that a majority of the small farms in the United States are low income producing and low-value farms. Such farms in 1925 were estimated to be worth, for land and buildings, less than $4,000 on the average. A considerable proportion had a value of $2,000 or less. Many small farms have poor soil and difficult surface conditions. Probably nearly 40 per cent of the country's farm population lives on small farms of poor and difficult land, on a standard of living far below what is common on large farms.

Farm families belonging to this low-standard group are numerous in nearly all the States. How to improve their condition is a complex problem involving economic, social, and human factors. It is not primarily a question of tenancy versus ownership, nor a question of cropper cultivation versus cultivation by hired labor, though these elements may be present. Land-tenure conditions as a criterion for high or low standards of living may sometimes be overemphasized at the expense of more important factors. The first step toward improvement must be a correct analysis of the problem.

Side-Line Occupations Off the Farm

On many small farms only about half the cash income of the farm family comes from the farm business. The remainder is earned by the operator or by members of his family in occupations off the farm. In addition to the cash income obtained from the farm and income obtained in outside occupations, the small farm itself furnishes food, fuel, housing, etc. But all these sources combined commonly do not provide a satisfactory living. Often the difficulty is increased by the farm operator's pessimism as to the possibility of getting more income from the farm itself. He is not generally as quick to take advantage of scientific methods as is the larger farm operator. Yields per acre, per cow, per hog, or per hen on the small farms of the United States average lower than on the larger farms, whereas in certain European countries the opposite is the case. Too often,

moreover, the economic efficiency of the farm family is impaired by lack of adequate opportunities for education, recreation, and the preservation of health.

Further study of the small-farm problem as a whole is urgently necessary. A rough classification of such farms seems practicable and indicates the application of different remedies in different situations. (1) We may distinguish small farms whose earning power can not be materially increased through soil improvement or improved management. (2) There are numerous small tenant or cropper farms which form parts of a large holding or plantation. Often the soil of such farms can be improved materially and their production increased by efficient centralized supervision. (3) There are many small farms operated by their owners, the soil of which could be materially improved and upon which a better farm practice would bring much better returns. Then there are small farms that furnish a fair living place and some food, fuel, and other necessities, while permitting members of the farm family to work at outside jobs.

Different Remedies Required

These different kinds of small farms obviously call for different means of increasing their power to furnish a satisfactory standard of living. Farm management and marketing methods should be adapted specifically to each type. It should often be possible to encourage the development of rural industries adapted to the part-time employment of the small operator and his family. In certain areas where the economic operation of small farms is impracticable, State agencies should discourage the small farm. On the other hand, it is well to recognize that a place exists for the small farm providing a lower all-round income than the larger farm usually produces, since many families may do better on such small farms than they would anywhere else.

Effective action to raise living standards on our small farms is necessary, not only in the interest of the farm people immediately concerned, but in the interest of the Nation. These farms are a source of population as well as of food supply. They send their surplus population to the towns and cities. Hence the entire Nation suffers when living conditions on the small farm make it difficult to rear and educate young people adequately there. Not agriculture alone, but our entire national life stands to benefit from whatever may be accomplished toward the establishment of a satisfactory standard of living on the small farms.

AGRICULTURAL EXPORTS

Total exports of agricultural products, excluding forest products, amounted to $1,847,567,000 in the fiscal year 1928–29, an increase of about 2 per cent over the previous year. Gains were made in the exports of cotton, tobacco, pork products, fruit, and feed grains. Shipments of wheat declined. Agricultural exports in the past year made up only 33 per cent of our total exports of all commodities, the smallest percentage, with the exception of that for 1917–18, on record.

Exports of cotton during 1928–29 increased about 7 per cent over those of the preceding season. Great Britain, Japan, and Italy took substantially larger quantities of American cotton but exports to Germany, France, and Russia declined. The present season opened with activity of foreign cotton mills as a whole apparently on a lower level than last year. Our exports of wheat declined about 25 per cent last season as compared with 1927–28, in spite of a somewhat larger wheat crop. There was increased competition from large wheat crops in Canada and the Southern Hemisphere. Moreover, increased European production of wheat in 1928 reduced Europe's import requirements. Exports of corn, barley, and oats in 1928–29 were materially above those of the preceding year, largely because of an improved European demand following a poor harvest of feed grain crops in Europe.

Exports of flue-cured tobacco, which now constitute almost three-fourths of our total leaf-tobacco exports, increased 26 per cent over those in 1927–28. The increase was due almost entirely to the fact that very large shipments were made to China during the last six months of 1928 in anticipation of higher import duties. Exports of flue-cured tobacco to China in the first half of 1929 were much smaller. Exports of air-cured and fire-cured tobacco were smaller in 1928–29 than in 1927–28, and the outlook for future exports of these types is not so favorable as for flue-cured tobacco.

Increased Exports of Pork Products

Fewer hogs and reduced pork production in Europe resulted in larger exports of pork products and lard from the United States during the last fiscal year. Exports of cured pork increased 3 per cent and those of lard 9 per cent. The increased quantities of pork were exported at higher prices. Lard prices, however, were lower than in 1927–28.

Exports of fruit increased largely last season. Shipments of boxed apples to foreign markets were the largest on record. Exports of barreled apples were close to the record figure attained in 1926–27, when the crop in the eastern barreled-apple States was much larger than that of last year. Poor apple crops in Europe resulted in greatly increased takings of American apples by continental markets. Exports of oranges and grapefruit continued to increase. Shipments of California oranges to Great Britain during the past spring and summer were unusually heavy. A record production of prunes and raisins in 1928 contributed to a further expansion in the exports of these products. Some of the increase in the prune exports was due to reduced competition in European markets from Yugoslav prunes.

THE TARIFF

It has come to be more generally recognized in recent years that tariff protection for the farmer is a necessary part of a sound national agricultural policy. American agriculture was formerly more dependent on foreign market conditions than it is to-day; and many students doubted whether tariffs could be effective on farm products. It is a truism that goods produced largely for export usually have their prices determined in the export trade.

Since 1900, however, agricultural exports have been a diminishing part of our total agricultural production. From 1924 to 1926, inclusive, the value of our exports of animal products and of crops not fed to livestock was only 16 per cent of the value of our total production of such products, whereas it was within 24 per cent for the period 1899 to 1903. Simultaneously our imports of agricultural products increased. On the other hand our industrial exports became an increasing part of our industrial production.

American agriculture is still far from being on a domestic basis, and will undoubtedly have large quantities of certain products to export for many years. Nevertheless, it can profit increasingly from tariff protection. This is true even of crops that are quite largely exported. Hence the consideration by Congress of a tariff bill providing substantial increases on the duties of many agricultural products is a happy augury. This Nation is committed to the protective principle. The tariff legislation in prospect, coupled with the trend in our foreign trade, promises to make that principle more effective for agriculture. There is no need to discuss the tariff schedules proposed. It is sufficient to point out that agriculture benefits substantially from existing duties, and can use increased protection. The tariff conspicuously assists producers of flax, cane and beet sugar, fruit, beef cattle, sheep and wool, and dairy products. Our beef-cattle industry has been on a domestic basis for years. Under the protective policy our sheep industry, though faced with keen foreign competition, is expanding. Our dairy industry has shifted from an export position to one in which it barely meets domestic requirements. It can thus benefit materially by import duties on its principal products. Without tariff protection the price of butter would be materially reduced in the season of low production in the United States, and the incentive for production in that season would be diminished. Though we export large quantities of lard and other pork products, and import only small quantities, tariff duties on these products can give some protection against imports from Canada. Duties on vegetable fats and oils can protect the domestic market for lard indirectly, and to some extent the domestic market for other pork products. Such duties can also protect the producers of cottonseed and dairy products.

Tariff Protection on Corn and Wheat

Tariff protection can be effective on corn and wheat, though our imports of these commodities are small. Duties on corn can protect the coast markets against Argentine corn, particularly in seasons when the Argentine crop is large. Without such protection corn can not be shipped in such seasons from our corn States into coast markets in competition with corn from Argentina. Tariff protection is effective on wheat when the Canadian crop is large and the United States spring wheat crop is short. Even our cotton industry can be benefited by a protective policy though we export half our cotton. Protection against the importation of long-staple cotton would strengthen the domestic market for the longer American staples. In short, agriculture is by no means on a world-market basis exclusively, but is well placed to share the benefits of our protective system.

HELPING THE FARMER LOOK AHEAD

Increased attention was given to the issuance of economic information in a usable form. It is now six years since the department began its system of outlook reports as an aid to farmers in adjusting their production. In the main these reports necessarily present a national rather than a local point of view, and need to be supplemented with regional and local information. Accordingly, the outlook work as now conducted involves close cooperation between Federal and State research and extension workers, so that data about main trends in production and prices may be related to the requirements of particular farms. Not all the producers of a given commodity should increase their production when the prospect is for favorable prices, nor should they all curtail their output when the prospect is less favorable. Much depends on whether the individual farmer's costs of production are relatively high or relatively low. It is therefore necessary to combine general economic information with farm-management studies. This has been done extensively of late with gratifying results.

In the preparation of the national outlook report, workers from every State participated. Some States had several representatives at the outlook conferences in Washington. In turn members of the department cooperated with State economists and extension officials in drawing up regional applications of the main report. Thirty-eight State agricultural colleges issued State outlook reports. Federal economists also cooperated with county agents in interpretations of the outlook material on a county basis. Economic charts proved effective in promoting better adjustments of production. Some idea of the scale on which the outlook extension work was conducted is given by the fact that 250,000 copies of the national and 215,203 copies of the State outlook reports were distributed. More than 2,500 outlook extension meetings were held, through which more than 100,000 farmers were reached directly and thousands of others indirectly. Outlook information was also distributed in a national radio broadcast including 32 stations. The widespread interest shown in the reports is indicative of the use made of outlook information by farmers.

Budgeting in Wider Use

Budgeting as a method of shaping farm-production programs was brought into wider use. By this method, Federal and State extension workers draw up programs for typical farms with prospective receipts and expenses estimated and compared with similar figures for other programs. Thus farmers can decide what to grow, with increased understanding and confidence. Attention was given also to the forecasting of production trends over a period of years, as a basis for long-time farm programs. This work called for studies of the foreign production and the foreign consumption of hogs, wheat, cotton, and other crops much influenced by world conditions. Necessary data were obtained from the department's representatives in foreign countries, from the State Department's consular service, from the International Institute of Agriculture at Rome, and from foreign ministers of agriculture, and other official sources.

Additional facilities for gathering foreign information, however, would have been very useful. World competition in some agricultural products has increased in recent years. If the farmers of the United States are to work out definite long-time programs on a sound basis, they need much more information about conditions abroad than is at present available. Changing European production is vitally important in the hog market. In the wheat market, trends in foreign acreage are as significant as trends in acreage here. It is the same with cotton. When India increases its production of cotton, or consumers change their demand for various staples, the American grower needs to be quickly informed. A stronger foreign agricultural service, with specialized research workers, would greatly facilitate the department's efforts to help farmers in planning ahead.

Increased appropriations for reporting on fruit and vegetable crops enabled the department to issue new outlook reports dealing with these commodities last year. Several will be issued during the crop year 1929–30 on such special crops as early potatoes, lettuce, and canning crops. The extension services of Virginia, Maryland, and North Carolina are cooperating with the department in a special study of the early potato situation, which promises to have great practical value. Extensive publicity will be given to the department's intention-to-plant reports regarding potatoes. Arrangements have been made for cooperation with growers, producers, cooperative organizations, and national distributors in an effort to effect a better adjustment of the early potato acreage.

An Example in a Tobacco Area

How farmers may increase their income by adjusting their production to changing market conditions was recently demonstrated in the tobacco belt of Virginia. A few years ago farmers in this area produced dark tobacco of a type which faced a steadily declining export demand. Analysis of the market situation and of farm-management conditions on individual farms was made by representatives of this department in cooperation with the Virginia Polytechnic Institute. As a result, certain changes were recommended to the farmers concerned. Eight men who changed their operations accordingly increased their net earnings from less than $800 a year to more than $1,100. Four men ignored the recommendations, and the incomes of these men declined. This striking illustration of the practical value of economic studies combined with farm-management analysis impressed many near-by farmers and led to additional favorable changes in farm organization. Similar illustrations could be cited for other regions.

SHIPPING-POINT INSPECTION

Inspection of fruits and vegetables at shipping points increased by 18,367 cars during the last fiscal year, making a total inspection of fruits and vegetables of 266,831 cars. In addition, 5,202 cars were inspected at receiving points. Handlers and receivers of large quantities of fruits and vegetables, such as cold storage and express companies, made increased use of the inspection service, and inspection

for large terminal organizations grew rapidly. Inspection of dairy and poultry products increased slightly. Grading of hay and inspection of the graded shipments was made a regular service at 25 commercial points and 33 army posts, and the volume of the work increased materially. A seed-verification service, begun the previous year, covered the product of 60 commercial firms, and offered a valuable safeguard to purchasers of certain seeds. Use of the inspection service for soybeans by large crushers greatly increased. Demands for the classification of cotton increased also. The number of bales classified (exclusive of reviews) was 446,181 compared with 137,695 the previous year. Grain-inspection supervision was supplemented by a campaign to bring about a better understanding of the standards on the part of country grain dealers, and all previous records for the handling of appeals were broken. Grading and stamping of dressed beef was done in eight market centers, where 58,571 carcasses were graded and stamped.

MARKET-NEWS SERVICE

The market-news service was carried to several areas not previously reached. The southern circuit of the leased wire was extended to Montgomery, Ala.; Nashville, Tenn.; Jackson, Miss.; and New Orleans, La., where market-news offices were opened in cooperation with State agencies.

In the West a leased-wire drop was added at Sacramento, and in the Northwest the wire was extended to Portland and Corvallis, Oreg., Seattle and Spokane, Wash., and Boise, Idaho. In cooperation with several State agencies, distributing offices were opened to issue reports on the principal farm products of the several areas. Offices at Cleveland and Detroit were connected with the main line of the leased wire. With a few further extensions, the leased-wire service will carry the market news quite generally to the important markets and distributing points.

Statistical Charts Widely Used

As an aid to the States, the Bureau of Agricultural Economics prepared a series of over 100 charts presenting statistical data needed in local outlook meetings. These charts were issued in large wall-chart form. More than 3,000 copies were distributed for use by extension lecturers. Special chart books were also prepared as well as other literature to supplement the outlook statements. Economic publications designed particularly for extension workers were more used. Though these publications were trebled in number, the demand was not satisfied.

A recent survey showed that 287 research projects were under way in the Bureau of Agricultural Economics. Most of these concerned farm management and costs, statistical research, cooperative marketing, land economics, and agricultural finance and marketing.

Among the newer projects were a number relating to the analysis of the factors affecting the prices of wheat, corn, wool, butter, potatoes, tobacco, cattle, and fruits. This form of research is of primary importance in connection with outlook work and in the development of plans for marketing.

DEMAND FOR HIGHER-QUALITY PRODUCTS

Significant among recent developments in agricultural marketing is an increased demand for the higher-quality products. Such products bring higher premiums over ordinary or low-grade commodities than they formerly did. In fact, the lowest grades of some products are disappearing from the markets, as no longer worth handling. More general standardization and inspection of products have induced both producers and traders to pay more attention to quality. But the premiums offered for superior-quality goods in the central markets are not always reflected in the prices paid to the producers. Investigations to determine how this may be remedied are now under way in the department, and some practical developments have resulted.

Studies during the last year have sought to show precisely what determines good quality in different farm products, what qualities are in the greatest demand, and what quantities of the different grades are commonly produced. Some of the studies have followed products through market channels to the consumer. The distribution of peaches, prunes, honey, rice, and other commodities has been analyzed to reveal consumer preferences, and methods followed in the wholesale and retail markets have been observed. In this way a foundation has been laid for practical recommendations as to the production of better-quality goods. Farmers are not always rewarded in proportion to the effort they exert in the production of high-quality goods, but improvement in marketing methods and in knowledge of consumers' wants tends to bring about a more equitable reflection of quality differences in price differences.

Perhaps the best-known example of systematic effort to make country markets more sensitive to quality differences in farm products is the department's cotton grade and staple estimating work. The primary object of the grade and staple estimates is to indicate profitable opportunities for the production of better-quality cotton. Such opportunities depend of course on the degree to which quality production is encouraged by cash rewards. Farmers will not produce the kind of cotton demanded by the mills, even when they are in a position to do so, unless it pays them better to grow that kind of cotton than to grow any other kind. Heretofore the grower of superior fiber has often had to take a price no better than that received by his neighbor for inferior cotton. The department's grade and staple estimates should help eventually to overcome this drawback by facilitating the assembling of good cotton at country points in commercially significant quantities.

Premiums for Quality in Meat Animals

Studies of the value of meat animals, particularly cattle, are under way which will enable the department to advise livestock raisers regarding the most profitable types. For the year 1928 the average price of Choice and Prime steers at Chicago was $15.82 a hundred pounds. In the same season the average price for Common steers was only $10.76. The difference of $5.06 was purely an expression of quality difference. It does not follow of course that a similar

spread would prevail should the production of the better grades be relatively increased. However, room certainly exists for the profitable production of more choice cattle. The relative quantities of the various qualities of cattle that the market will absorb readily are being investigated to enable the department to advise farmers what type of animals to put in their feed lots.

Though increased egg production has been accompanied by a general decline in the level of egg prices during the last few years, each season has seen a better quality of eggs marketed. It has also seen a widening of the spread between the prices of good-quality and the prices of poor-quality eggs. Fresh eggs of the best quality sometimes sell in New York in the winter months for double the price of low-quality fresh eggs. However, the depressing effect of heavy low-grade production affects the prices of all eggs. The department is endeavoring to lessen this influence by encouraging the better handling and the closer grading of eggs at points of production.

More laboratory facilities for protein testing are required, so that the protein content of wheat may be more accurately reflected in prices at the farm. As is well known, the quality of wheat for milling depends largely on its protein content, and high-protein wheat is usually sold at a premium. It is therefore very important to measure protein content as a market factor. The testing must be done in well-equipped laboratories. Though private and commercial laboratories, and in some cases State laboratories, afford considerable service of this kind, the demand is not yet adequately met. A much more general testing of the crop for protein is necessary if the full value of the grain is to be reflected in the prices paid to the producers. It is therefore gratifying to report that Federal legislation to meet the situation has had favorable consideration in Congress.

LAND UTILIZATION

Much of the economic hardship suffered by farmers has been caused by too rapid expansion of the area devoted to farming. The eagerness of land-owning interests and selling agencies to induce farmers to occupy undeveloped areas, public encouragement to land settlement, and other influences have contributed to overrapid agricultural expansion in this country.

Our public-land laws and policies have favored expansion. Many millions of acres of Federal land in the Great Plains and intermountain regions were occupied in the years preceding 1921. Expansion through homesteading was brought practically to an end only by the virtual exhaustion of the supply of public land suitable for farming outside of areas requiring irrigation. The policy of the Government in exempting settlers on Federal reclamation projects from payment of interest on construction costs has also stimulated expansion.

Expansion has been misdirected as well as overstimulated. Additional crop land has been brought into use through drainage projects undertaken without due consideration of the comparative advantages, private and public, of reserving the areas as refuges for wild life. The drainage of marshes and shallow lakes has greatly reduced the area available to wild fowl for breeding, feeding, and resting, and

necessitated a Federal program to conserve marshland for migratory birds. Much inferior land has been occupied by settlers unfamiliar with local conditions and with the physical characteristics of the land, and unaware of the handicaps they were assuming. Some of these settlers have been overpersuaded to purchase tracts better suited at present to forest uses than to tillage. One of the major causes of the postwar depression in agriculture was previous overexpansion under the stimulus of war-time influence and of public and private land policies.

The remaining area physically capable of use for crops, but not at present so used, amounts to nearly a third of the total land area of the continental United States, and exceeds the area in harvested crops. This land is mainly of inferior quality. Much of it would require expensive clearing, drainage, irrigation, or soil improvement. It is mostly in private ownership. Though a large acreage is within the boundaries of existing farms, extensive holdings are owned by lumber or mining companies, railroads, and land companies. Since ownership involves outlay for taxes and other charges, many owners are impelled to promote the utilization of the land for farming. The desire of local communities and of local business interests for development reinforces the tendency to press the land into use.

Lands That Should Be Farmed

Lands not yet brought under cultivation but capable of making a good return on the development cost and a good permanent living for the farmer occupants should be farmed. To try to prevent it would be ill-advised. The urge to settle, and the community and private interest arrayed on the side of development, are bound to extend cultivation to new lands of this character. That the result may force lands elsewhere out of use is not a valid reason for opposing the new development.

The remedy for overextended agriculture is to curtail production, and the place to curtail is where returns are lowest. The problem is two-fold: To hold expansion in check where it would extend cultivation to marginal and submarginal lands, and to get lands of this character out of cultivation.

The per capita land requirements of the Nation for agricultural production are being reduced by the substitution of mechanical for animal power and by various economies in crop and livestock production. Furthermore, the rate of increase in our population is declining rapidly. A sound agricultural policy would help to prevent the waste of effort involved in the cultivation of farms where basic physical conditions or general economic conditions, or both, are unfavorable. Such a policy would seek to relieve the farming industry from the depressing effect of misdirected effort and misplaced farms.

Many farms that are now submarginal were established by hardy pioneers when agriculture was largely noncommercial. The passing of game and merchantable timber, the progress of soil erosion, the competition of commercial farming in the West, the attraction of other occupations, and the demands of higher living standards have made thousands of these farms obsolete. This condition is found particularly throughout much of the Appalachian region from Maine to Georgia, including the plateaus on the west, in the region

known as the Highland Rim, in the Ozarks, and in some of the western mountain areas. Some areas formerly adapted to commercial-crop production have sunk below the economic margin chiefly through soil depletion or erosion. A combination of soil deterioration and boll-weevil damage has made much land essentially submarginal in parts of the old Cotton Belt. In other areas, such as parts of the northern Lakes States and various parts of the Atlantic and Gulf coastal plains, relatively infertile lands have been occupied, the cultivation of which is not justified by present conditions.

In extensive areas that have become submarginal, gradual farm abandonment is taking place. Many farmers have abandoned their farms entirely, but there are various stages of abandonment. In many instances the practice of depending in part on outside income is virtually partial abandonment. In its most extreme form, farm abandonment becomes land abandonment. This stage is reached when present and anticipated returns from the land sink so low that no one considers it worth while to pay the taxes.

Abandonment Through Tax Delinquency

The abandonment of farms through tax delinquency is most serious in regions of extensive timber holdings which, following destructive lumbering and forest fires, are similarly becoming tax delinquent. As tax delinquency increases, the economic problems of the farmers who remain and of the local communities become more acute. Migration of the forest industries as the timber is cut out decreases the population, curtails the local market for farm products, diminishes local mercantile business, and causes a rising per capita cost for schools, roads, and other functions of government. As the forests wane, agricultural welfare is depressed, and farm abandonment tends to follow.

It is therefore clear that to discourage the occupation and cultivation of lands ill-adapted to farm operation should be part of a sound agricultural policy. But the task should not be thought of as primarily preventive. To attempt merely to restrict the use of land would be wrong. It would meet with inevitable resistance, since it would run counter to many interests and to the human desire to make use of land, and it would be economically unsound wherever the productive employment of land was possible. A constructive land policy is required. The task, while large and difficult, has great possibilities for the advancement of rural welfare. It should promote economic reorganization in the regions of extensive submarginal farm lands.

The three great forms of use to which all but an insignificant proportion of our land area can and must be put, if the land is used at all, are tillage, pasturage, and forests, including parks or wild-life refuges. It is necessary to determine, as nearly as possible, what lands are best suited to each of these uses or to their various combinations.

Forest use should be developed to make it a more efficient form of land use. Intelligent forest culture is required. A serious shortage of timber can be prevented only by extensive reforestation, particularly near the principal centers of consumption in the East and

South. Probably less than one-half our present forest area is satisfactorily stocked with growing timber of merchantable species. Even if all of the area of forest and cut-over land, approximately 470,000,000 acres, were growing timber under effective fire protection and intensive forest management, the annual growth would only about equal the present consumption.

Uncertainty as to Land Uses

More adequate reforestation is retarded by uncertainty as to the most economical utilization of particular areas. Much vagueness exists as to what lands might be economically farmed. It is not clear what lands could profitably be reforested by private enterprise and what lands will have to be reforested, if at all, by public agencies. The investigation necessary to settle these questions is highly complex, and usually requires facilities beyond the reach of the average landowner. Local interests generally lack the perspective needed to determine a policy of utilization consistent with national interest. Public action, such as changes in the tax system, is required to modify the basic conditions of land utilization in many localities.

These considerations point to the need for a public policy of economic land classification. This department has made several local land-utilization studies, mainly to test various methods of land classification. Several States have made inventories of their land resources. But more comprehensive land classification should be undertaken. Many aspects of the problem of promoting effective land utilization are national. Land classification on a national scale should be begun by the Federal Government, with the fullest possible participation and cooperation of the States.

The basis of such a classification would be definite information concerning the physical characteristics of various types of land. Physical and economic information thus assembled and organized would make it possible to determine whether areas of impoverished or decadent agriculture could be restored to prosperity by a reorganization of farming. For farming areas which could not be thus restored, the determination of the fact would indicate the true course to follow. It would also facilitate a program of regrouping population in sparsely settled areas so as to economize expenditures for schools, roads and other utilities. The economic possibilities of areas hitherto not employed for agriculture might also be determined.

Early Attack Essential

What can be done and should be done immediately is to recognize that there is a great problem of land use, that an early attack upon it is essential, that research is needed in diversified fields, and that it should be carried on systematically under a unified plan of coordinated action. Forest research, for example, should not be confined to study of the forest itself and of methods of managing and protecting forest lands so as to obtain the largest yields of forest products at lowest cost. Market requirements and possibilities are quite as important as management methods. The landowner needs to know what to grow as well as how to grow. New ways of utiliz-

ing forest products may open new requirements for raw material. Improved methods of manufacture may raise the value of stumpage. Economic and industrial studies are integrally a part of the program necessary for furthering right land use.

To determine the best form of use for lands of various classes and types, in all parts of the country, and the practices necessary to obtain from each class and type of land the highest yield of the most desirable kinds of products is a very large order. But in addition, sound, forward-looking public policies will have to be formulated and put into effect. It is impossible to do more now than suggest in a very general and fragmentary way, what an adequate public policy designed to promote efficient land utilization should include. Undoubtedly such a policy would make necessary substantial changes in taxation policies and methods. For example, present tax laws in many States are operating as a strong deterrent to reforestation on the part of private owners, and in some States have led to stripping the land of everything salable followed by abandonment through tax forfeiture. The public is thus saddled with responsibility for the land under conditions which make its restoration to productiveness a slow, difficult, and expensive process.

Again, public aid and encouragement to the adoption of desirable forms of land use, and to the adoption of methods that will make such use possible, will need to be extended through cooperative and educational activities. The public task will have to include extensive public ownership of lands that can be made to serve their higher purpose in no other way. Already there is extensive public ownership of this kind. It is partly Federal, partly State and municipal. Public ownership is necessary in order to (1) protect watersheds and prevent soil erosion, (2) conserve timber and grow forest crops, (3) provide for public recreational needs and preserve unspoiled for public enjoyment natural beauties and scenic resources, (4) determine and demonstrate to private owners methods of handling similar lands profitably without lowering or destroying their value, and (5) preserve and utilize forest-land resources that are not attractive to private investors. Public ownership for these purposes is being extended, and public sentiment seems to be in favor of doing still more.

Public Purchases of Submarginal Lands

There is marked interest in the possibility of aiding the stabilization of agriculture by public purchases of submarginal farm lands, with a view to their conversion to timber growing. Such purchases would no doubt be largely confined to mountainous timbered regions where a large percentage of land is already in woodland and the farms are largely limited to small patches of tillable soil, often rocky, frequently subject to erosion, and not adapted to cultivation with modern power-driven machinery.

A policy of submarginal land acquisition would aid in working out the problem of flood control. One of the reasons for establishing the western national forests was watershed protection. These forests, created from the public lands of the United States, cover the mountains of the region. In the East the Federal Government has been acquiring forest lands by purchase, primarily for watershed

protection, for nearly 20 years. The lands thus acquired are also mountain lands, protecting portions of the headwaters of a number of the principal navigable rivers. They are under administration as national forests. The total area acquired or approved for purchase from the passage of the Weeks law, in 1911, to the close of the fiscal year 1929, was 3,604,898 acres.

It is a great misfortune for the East that almost all its forest lands had passed into private ownership before the national-forest policy was inaugurated. Except in Arkansas, Florida, Minnesota, and Michigan, no considerable acreage of public domain forest lands was left that could be reserved and put under Federal administration. With some small scattered remnants of similar lands in other States, a total of 2,230,735 acres has been set aside for incorporation in the eastern national forests. The transfer of certain Federal lands that were being held for other purposes, and land acquisition through exchange have added 224,789 acres. Including lands acquired or in course of acquisition through purchase, the eastern national forests now contain 6,060,336 acres of Federal lands.

The States in the East own 5,000,000 acres of land that are either under public administration for forest and park purposes or are being held with a view to their administration or possibly their exchange as a means of blocking up administrative units. Virginia, North Carolina, and Tennessee are acquiring lands preparatory to their gift to the Federal Government for administration as the Shenandoah and Great Smoky Mountain National Parks, with a contemplated minimum area of 755,000 acres. County and town forests in the Eastern States approximate 500,000 acres. Yet all the publicly owned lands in the East that have been set aside or acquired with a view to their permanent public administration make up less than 4 per cent of the total eastern forest area. The public welfare requires a much greater percentage than this.

Public Ownership for Timber Production

The use of land for timber production as an alternative to nonuse is in large part the crux of the forestry problem in the East. In the belief that the self-interest of private owners could be relied upon to work out the most desirable form of use and to apply the methods that would make the land yield most, the Federal Government and the Eastern States alike long pursued policies of land disposal. Contrary to the early expectation, private ownership has brought a lowering of the productive value of large areas, and no small amount of actual land wreckage. When private ownership becomes no longer attractive, the land reverts to public ownership via tax forfeiture—an evil that will increase greatly unless public policies are altered. Even though the land remains in private hands, it may become and often has become a menace to the public welfare. The chances are that a substantial percentage of the 335,000,000 acres of privately owned forest land in the eastern half of the United States will eventually have to be acquired and administered as public-forest properties. National, State, and local community interests are all involved. All should share in the task; and unless all do energetically share in it, there can be no expectation of its satisfactory accomplishment.

The movement for county forests is a very recent development. It has important possibilities in some States. Town forests, too, are increasing rapidly in number; the oldest dates, it is said, only from 1914; yet several hundred are now in existence. While their purpose will for the present doubtless in most cases be primarily either to protect city water supplies and local scenic areas or to provide public recreation grounds, they may in time become increasingly the source of wood supplies harvested for revenue and a factor by no means negligible in bringing about the return to public ownership of a reasonably large acreage of the eastern forest lands. In Switzerland two-thirds of the forests are municipally owned. In this country, however, the major share of the task of public ownership will unquestionably have to be assumed by the States and the Nation.

States' Interest in Forestation

In some ways the States are more immediately concerned than is the Federal Government in preventing deforestation. The loss of property values and the decline in public revenues which exhaustion of the forest resource entails, if development of the land through other uses does not follow, affect most severely the localities and the States. Upon the States rests the responsibility to adopt land and forest policies to prevent their impoverishment through the vanishing of their timber resources. They have the police power necessary to restrict abusive practices and to prevent forest-land denudation; they have the power to adjust taxation so that it will not operate as a deterrent to timber growing; they have the power to take over and administer tax-delinquent lands; and they have a strong incentive to use these powers to prevent economic retrogression. But many of the States are wholly unable to assume the cost of acquiring and reforesting extensive areas of deforested land. This is true particularly in the States where forest destruction has been most general and reforestation is most urgent. The financial exigencies of such States or of their local political units are leading them to look with disfavor on any course that will tend to remove land from the tax rolls.

It is worthy of thought whether a program of Federal aid to States for the purchase and reforestation of lands by the States themselves would not prove valuable. The Federal-aid principle has been established in connection with the highway program and has proved a very stimulating influence in the construction of roads. A program of Federal aid to the States for forestry might prove equally valuable. All the resources now appropriated by the Federal Government for forest-land purchases must be employed in the prosecution of the program as outlined in existing laws. That program includes the purchase and administration of lands by the Federal Government for the promotion of timber production, as well as primarily for the protection of navigable streams. It is believed, however, that in the two forest regions of the East in which the greatest need exists—the Lake States and the South—purchases for the former purpose should be directed primarily to demonstrating the practices necessary for successful timber growing by other forest owners, private and public, and at keeping in pro-

duction forest lands which can be made to pay for protection and management only under Federal ownership. Through such activities examples will be set that should have a very powerful regional influence, and lands that would otherwise be a local liability may be made a local and national asset.

Policy of Federal Acquisition

The policy of Federal acquisition was established by the Weeks law, in 1911. Under this law purchases were limited to lands needing to be kept in forest for the protection of navigable streams. The law provided also, however, that the acquired lands should be permanently administered as national forests. The Clarke-McNary law broadened the purpose of acquisition to include specifically the promotion of timber production. The purposes of Congress, therefore, include not only the acquisition of lands needed for the protection of navigable streams and for continuous timber production to meet public requirements, but also the extension of national-forest administration, which aims at the coordinated development and use of all the forest resources, including recreational and wild-life resources; and beyond that, there is the purpose to aid in solving the forest problem of the United States.

So far, 36 separately designated units, situated in 17 States, and containing a gross area of 13,598,332 acres, have been approved as purchase areas by the National Forest Reservation Commission. Within these purchase areas the Federal Government now owns 6,060,336 acres. Of the remaining 7,537,996 acres, approximately 80 per cent, or 6,023,200 acres, eventually should be acquired. The National Forest Reservation Commission has indorsed a further program, formulated by the Forest Service, which contemplates the establishment of 23 new purchase areas with an approximate gross area of 3,035,000 acres, of which 90 per cent should be acquired.

On the basis of the past average cost of purchase, the full program will, if its completion is authorized by Congress, entail an expenditure of approximately $50,000,000. This purchase program does not anticipate such action as Congress eventually may take with reference to the establishment of forests as features of the Mississippi River flood-control program, or for agricultural relief through the withdrawal of marginal or submarginal lands from crop production, or for protecting the projected system of inland waterways, though some of the land included in the program is on the drainage of the Mississippi, and some of it is marginal or submarginal land hitherto cultivated, or which may be cultivated if not acquired for forest purposes.

Experienced Personnel Required

A minimum organization of skilled and experienced personnel must be maintained to handle acquisition work efficiently and economically. Urgent need exists for the enactment by Congress of a specific fiscal program and policy extending over a sufficient period of years to guarantee continuity and stability of plans and organization. This need was recognized in the original Weeks law, which not only authorized but made appropriations for a 5½-year period.

It was recognized again in the Woodruff-McNary bill, which as it passed the Senate authorized appropriations of $40,000,000 over a period of 10 years, and as finally enacted authorized appropriations of $8,000,000 over a period of three years. The Woodruff-McNary authorization will expire with the fiscal year 1931. Prior to its expiration a new fiscal plan and program is needed which will afford a basis for the future planning and prosecution of the purchase work.

SOIL EROSION

A problem urgently needing study in connection with the working out of efficient land use is soil erosion. That soil erosion is a national menace is now recognized. The appropriation by Congress of $160,000 for its study is an evidence of this recognition. The losses resulting from unrestrained erosion amount to many millions of dollars annually. There is evidence to indicate that the direct loss to the farmers of the Nation is at least $200,000,000.

The work of the Soil Survey of the Bureau of Chemistry and Soils, the investigations conducted by the Bureau of Public Roads, and the forestry and range-management studies carried out by the Forest Service have all served to indicate the wide extent to which the lands of the United States have been subjected to destructive erosion. A single county in the Piedmont section of South Carolina was found by actual survey to contain 90,000 acres of land formerly cultivated which has now been permanently ruined by erosion. In another county in the Atlantic coastal plain of Georgia, 60,000 acres of formerly fertile soil was found to have been washed and gullied beyond repair. In the brown-loam belt along the Mississippi River, many counties have been found to contain 10,000, 20,000, or 30,000 acres of land that have been ruined. Agriculture has been largely driven out of the uplands in this region by reason of destructive and unrestrained erosion. Also large areas of good alluvial land have in many cases been buried beneath infertile sands washed out of the upland gullies. Stream channels have become so choked with erosional débris that overflows have become exceedingly common, and large tracts of formerly productive soil are now being classed as swamp land.

The erosion problem has two aspects. One concerns the loss of soil fertility and soil material caused by the run-off. It is not the plant food alone that is removed by rain wash, but the solid soil material itself. The plant-food elements removed from the soil by growing crops can be restored in the form of fertilizers and manures, but the soil that is washed from the fields can not be restored except by natural processes that require centuries. When the mellow topsoil with its valuable humus and nitrogen is gone, there is exposed in its place the subsoil, which is less productive, less permeable, and less absorptive of rainfall. Usually this exposed material is heavier than the original soil, stiffer, and more difficult to plow.

Other Aspects of the Erosion Problem

The other aspect of the erosion problem concerns the consequences in the form of stream pollution, swifter run-off, and the eventual disposal of the soil and rock material carried away. Erosion causes

the silting of streams, reservoirs, and irrigation ditches, and the destruction or serious impairment of alluvial agricultural lands by overwash of sands and gravel.

This second aspect of the erosion problem makes it a part of the problem of flood control, in the solution of which forests have a place. Forests are one of the means of holding erosion in check. They are also a means of utilizing for timber production lands that have ceased to be cultivable through gullying or surface wash. Millions of acres both in the more hilly farming regions and in regions where the character of the soils makes for rapid erosion should be forested in the interest both of erosion control and of the best land utilization. It is in those parts of the East where rough and broken topography, steep slopes, thin soils, and to some extent high elevation make successful farming impracticable, except on limited areas with especially favorable conditions, that the maintenance of good forest cover is most urgently necessary from the standpoint of watershed protection and flood control for the country as a whole.

The present area of forest land in the United States is approximately 470,000,000 acres. On at least 75 per cent of this area the forest is a factor, often of paramount importance, in the prevention of erosion or the regulation of stream flow. On a very large additional area, probably aggregating as much as 50,000,000 acres, from which forests have been removed, erosion has become so serious that possibly the only practical remedial measure is reforestation. On at least three-fourths of the 100,000,000 to 150,000,000 acres of chaparral, woodland, and brush-covered areas, located primarily in the West, it is probable that either the erosion or stream regulation influences of the vegetative cover, or both, are a factor. Erosion from either water or wind is of some importance on probably 90 per cent of the area of untimbered range lands, and of serious importance on at least 50 per cent of this area. Such erosion is primarily the result of overgrazing or of unscientific grazing by domestic livestock.

The approach to the control of erosion and the regulation of stream flow on forest lands, both in research and in the practical application of remedial measures, must be through forest management, including fire control. In chaparral, woodland, brush, and range areas it must be through prevention of fires and regulation of grazing.

In the absence of specific appropriations for studies of erosion prior to 1928, various investigations have been carried on by the Forest Service, the Weather Bureau, the Bureau of Chemistry and Soils, and the Bureau of Public Roads, more or less independently and in connection with researches in closely related fields of inquiry. These studies have had to do chiefly with the relationship between forest, chaparral, or forage cover and stream regulation and erosion control in a particular region, and with the prevention of erosion by terracing and the construction of soil-saving dams.

Assembling of Data Necessary

Of first importance in the development of a comprehensive program for attacking the erosion problem is the assembling of all

available information in regard to the eroded areas in the United States, particularly their location and extent and the rainfall and other climatic data. For a number of years the Bureau of Chemistry and Soils, in connection with the soil-survey work, has accumulated information concerning the general location of the eroded land. During the past year this general information, the volume of which is large, has been supplemented by a rapid general reconnaissance survey. As a result of this work 18 distinct areas have been roughly outlined, and estimates have been made of the extent of erosion in these regions.

Public interest in soil erosion and moisture conservation led to the introduction on the floor of the House of Representatives of the following paragraph in the section making appropriations for the Bureau of Chemistry and Soils for the fiscal year 1930:

Soil-erosion investigations: To enable the Secretary of Agriculture to make investigations, not otherwise provided for, of the causes of soil erosion and the possibility of increasing the absorption of rainfall by the soil in the United States, and to devise means to be employed in the preservation of soil, the prevention or control of destructive erosion and the conservation of rainfall by terracing or other means, independently or in cooperation with other branches of the Government, State agencies, counties, farm organizations, associations of business men, individuals, $160,000, of which amount $40,000 shall be immediately available.

Since it was clearly the intent of the act that the problem should be attacked cooperatively by both Federal and State agencies, a committee, consisting of three representatives of the Department of Agriculture and two from State experiment stations, was appointed to formulate plans and recommendations for carrying out the provisions of the act. The provisional program worked out by the committee includes (1) continuation of the erosion reconnaissance survey of the United States and preparation of a map showing the extent and distribution of eroded areas; (2) a survey of the methods now used to control erosion and to conserve soil moisture; (3) laboratory studies of the physical and chemical properties of different soil types in relation to erosion; (4) field and laboratory studies of terraces, soil-saving dams, underdrains, and cultural methods to determine the most effective methods of preventing and controlling erosion and conserving soil moisture; and (5) field and laboratory studies of the effects of forest cover, chaparral brush, and range cover upon run-off, erosion, and stream-flow regulation and similar studies of remedial measures through forest management, fire control, and range management.

FOREST FIRES

One of the most formidable impediments to the development of wise use of our land area is forest fires. The loss of merchantable standing timber caused by fires is serious. Much more serious is the effect of fires on watersheds, the impairment and sometimes the complete destruction of soil fertility, and the deterrent results on the management of lands for timber growing. Repeated fires are the principal cause of forest denudation and the eventual abandonment of forest land as worthless. Were the fire factor eliminated, the upspringing of new growth and the maturing of trees

too small to cut when the first timber crop is removed would result in forest values that would generally make the owner wish to hold and take care of his land or would induce its purchase and use by some one else.

The Federal Government is cooperating with 38 States in maintaining protective systems. All the States with considerable forest areas, except Arkansas, have organized protection. The total area under protection, however, exclusive of the national forests is only seven-tenths the area needing protection, and the expenditures are less than half the amount estimated to be necessary for adequate protection of the entire area. Private owners contribute a varying part of the cost, in some States more than 60 per cent, in some States none.

The Clarke-McNary law authorized Federal cooperative participation in the maintenance of State protective systems up to a maximum of $2.500.000 annually. This maximum was set on the assumption that a total of $10.000,000 annually would be necessary for adequate protection of all the land that should be covered by the State systems, that an equal division of the cost between the public and the landowners is reasonable, and that the public contribution should be divided equally between the Nation and the States. Last year, however, the Federal Government contributed only a little more than half as much as the States. The financial situation of many of the States makes it very difficult for them to increase their expenditures materially, but an increase in the funds available for Federal allotment to them should serve, as it has served in the past, to hearten their efforts. The appropriation for the current fiscal year is $1.400.000 as against $1.200,000 for the fiscal year 1929.

Forest-Fire Protection Difficult

On the national forests, of course, the entire task of protection is assumed by the Federal Government. It is a task of peculiar difficulties. The West has, generally speaking, a long summer dry season. Inflammable surface vegetation and litter, coniferous timber, rough mountain country, sparse population, and inadequate means of transportation and communication all contribute to the danger of large conflagrations. The principal cause of fire is lightning, which is often without rain and which in electrical storms may start hundreds of fires almost simultaneously. The storms at times cover wide areas, reaching perhaps into two or three States. At other times they are purely local. In either case, if they start a great many fires burning at once, they impose a severe strain on the limited organization available to fight them.

With the summer of 1929 ended the twenty-fifth fire season since the national forests came under the Department of Agriculture. At the outset protection presented a superhuman task. The forests were largely unbroken, unmapped, and almost untrodden rugged wilderness. Parts of them could not even be reached by a pack train without days and even weeks of trail clearing and building. There was no equipment, no personnel trained in fire control, no experience, and little money available. The small handful of forest officers, each in charge of a very large area, fought the fires as best

they could, almost barehanded and with such help as they could pick up. Local sentiment was generally skeptical of the possibility of fire control and inclined to be indifferent to the need for it, if not hostile to the whole forest enterprise.

Fortunately the first five years went by before the protective organization was subjected to the test of the exceptionally bad fire season. Such seasons recur at irregular intervals. They are the result of a combination of unfavorable weather conditions, such as unusually protracted and severe drought, much lightning, and violent hot winds. The year 1910 brought the combination, with disastrous results. More than 4,900,000 acres of land within the national forests was burned over, with Government losses estimated at more than $26,500,000.

Never since has even one-fourth of this loss been sustained. Seasons of unusual, if not comparable, severity were 1917, 1919, 1924, and 1926. Each taught its lesson. The weaknesses and local failures of the defensive system were carefully studied and remedial measures devised. The technic of fire fighting, the organization necessary to gather, transport, equip, and maintain on the fire line large numbers of men, the provision of material, the creation of an efficient system of detection, and the construction of an extending system of protection improvements, such as lookout cabins and towers, roads and trails, telephone lines, and firebreaks—all these and many other things have been developed progressively. The tightening up and improvement of the whole system of control is still going on.

More Protection Improvements Necessary

The area burned over in the national forests during the five years from 1910 to 1914 averaged 0.75 per cent of the total area, from 1915 to 1919, 0.6 per cent, and from 1920 to 1924, 0.29 per cent. In the 4-year period from 1925 to 1928, the comparable figure was 0.28 per cent. The public value of the resources protected and the impairment of this value that results when the land burns over call for a development of the protective system to a substantially higher level of efficiency than has yet been attained. The greatest need is for a material increase in the protection improvements, with which the forests are at present very inadequately equipped.

A constructive and promising move has been made by the Chief Coordinator and the Bureau of the Budget for coordinating the various forest-protection activities of the Federal Government. The Chief Coordinator organized early in 1927 a forest-protection board, made up of the heads of the Weather Bureau, the National Park Service, the Office of Indian Affairs, the General Land Office, and the Forest Service, to formulate and recommend general policies and plans for the protection of the forests of the entire country. On November 23, 1928, the board was established as a coordinating agency by the Bureau of the Budget. The first report of the board presented to the Chief Coordinator its conclusions regarding the action necessary to coordinate the protection against forest fires given Federal lands by the several bureaus administering them and to carry out the cooperative policy laid down by the Clarke-McNary law for protecting other lands against fire. The board was continued, and its functions were broadened to include protection from insects, tree diseases, and

rodents, and the Chief of the Bureau of Biological Survey and representatives of the Bureaus of Entomology and Plant Industry were appointed by the Chief Coordinator as additional members.

The forest-protection board, acting under the direction of the Chief Coordinator and the Bureau of the Budget, has a broad field of usefulness. The objectives of coordination and cooperation that have been thus set up for the forest-protection work of the Government as a whole and the establishment of the board as a means for attaining them are eminently desirable. That this move will lead to more adequate, better-planned, more efficiently carried out, and more consistently correlated Federal forest protection can not be doubted. It creates a most valuable instrumentality for fiscal planning.

FOREST RESEARCH

The magnitude of the problem confronting forest research, involving practically every region in continental United States and an area practically equal to that of improved agricultural land, indicates the need for systematic, orderly development which can only be met by a national program covering some such period as a decade. The complexity of the problem, involving in the neighborhood of a thousand tree species and an extreme diversity of topographic, climatic, soil, and other conditions, emphasizes the need for such a program. The McSweeney-McNary Forest Research Act meets this need. An outstanding feature of this act is its recognition of the numerous phases of forest research and their intimate interrelationship—silviculture, or the production of forest crops; the protection of growing crops and their products against fire, insects, decay, and disease; the problems growing out of the interrelationship between forest trees and wild life; the possibility of producing forage crops on forest lands as a basis for a domestic livestock industry; the problems involved in the manufacture and effective utilization of wood and other forest products; and the economic questions that must be understood in developing public and private forest land policies. Economic research in forestry has a close affiliation with the research of the Bureau of Agricultural Economics in the field of agricultural-land utilization. The problem of livestock production on forest-range lands is one of the group of related problems. Two classes of field units are recognized by this act—regional forest experiment stations, at which is being concentrated the local work of the Forest Service and other bureaus in the department, and a national forest products laboratory, at which departmental investigations relating to forest products are being concentrated. The forest research act provides for a 10-year financial program.

Research along such lines, long one of the activities of the department, should be continued and expanded. Economic studies of timber supplies and requirements, forest taxation, forest insurance, and related problems are integrally a part of the program necessary for furthering right forest-land use.

Research will improve the effectiveness of fire protection in the national forests, and also on privately owned lands. The authority for such work is contained in the McSweeney-McNary Forest Research Act, but appropriations will be required.

MEDITERRANEAN FRUIT FLY

Early in April of this year the Mediterranean fruit fly, perhaps the worst fruit pest known, was found to be well established in central Florida. Appreciation of the far-reaching economic significance of this discovery was immediate and nation-wide. It resulted in a general demand that the eradication of the insect should be undertaken at whatever cost. Several States offered to detail personnel to aid in the work.

To determine the extent of the invasion, and to start work against the pest, an emergency fund of $50,000 was released by Florida and a transfer was made of $40,000 of funds appropriated to the Plant Quarantine and Control Administration of this department for other objects. All available forces—State and Federal—were thrown into the task of determining the spread of the pest, of destroying fruit in infested and surrounding orchards, and of spraying trees with poison bait. State and Federal quarantines were imposed and restrictions placed on the movement of all host fruits and vegetables. This action stopped the movement of such articles from infested areas and provided for their movement from other areas under adequate safeguards.

Congress on May 2, 1929, approved a request for authority to use not exceeding $4,250,000 of the unexpended balance of $5,000,000 appropriated in 1928 for pink-bollworm control. This action made it possible to undertake vigorous scouting to determine the spread of the fly, and permitted repeated spraying of infested groves and other groves near by.

How the Mediterranean fruit fly entered the United States is not definitely known. It is widely distributed throughout the world, and effort to prevent its entry has been continuous since the passage of the plant quarantine act of 1912. Quarantines have prohibited the importation of known host fruits and vegetables from countries where the fly is found. Inspection at United States ports has resulted in many interceptions of infested fruit. The forces available for such port inspection, however, have never been adequate.

The first surveys showed that the fly was thoroughly established in several orchards within the town limits of Orlando, Fla., and at a few outlying points not more than 6 miles north or south. Later investigations indicated that Orlando was the starting point of the invasion. No infestations equally intense were found elsewhere. The infestation as determined by scouting during the past summer has strengthened the belief that the pest was recently introduced, perhaps during the spring or summer of 1928. Its spread can easily be accounted for by the movement of citrus fruits last season. The intensity of the infestation in a few orchards in Orlando is accounted for by the insect's high rate of multiplication.

Fly Found in 980 Localities

The fruit fly has now been found in more than 980 localities in 20 counties within the central and northern part of the peninsular portion of Florida. The area surrounding these points of infestation which has been included in control operations involves two additional counties—altogether more than 8,100,000 acres. This area con-

tains approximately 67 per cent of the bearing citrus trees in Florida. It produced 76 per cent of the 3-year average of citrus fruit moved from the State. Scouting in other parts of Florida and in the States within the Cotton Belt has brought to light no field infestation outside of the area mentioned.

The fruit fly attacks practically all fruits, the only important exceptions so far determined being watermelons, pineapples, strawberries, lemons, and sour limes. The vegetables subject to its attack are peppers of all kinds, tomatoes, eggplants, and lima beans and broadbeans. Movement of fruits, except those noted above, and of the listed vegetables is restricted by regulations. In Florida the fly has shown a special liking for grapefruit and the sour orange, among the citrus fruits, although it can propagate in all citrus fruits other than the lemon and sour lime. Other freely attacked fruits commonly produced in Florida are the guava, the fig, the Surinam cherry, the avocado, the peach, and the pear. No restrictions have been placed on the movement of fruits and vegetables not known to be attacked.

Prior to August 1 more than 580,000 boxes of citrus fruit, 3,400 bushels of vegetables, and 7,100 bushels of noncitrus fruits were destroyed. Not all these host fruits and vegetables were actually infested. They were destroyed because they had been produced in infested properties or within 1 mile thereof. More than three-fourths of Florida's citrus fruit crop had been marketed before the fly was discovered. A large portion of the citrus fruit destroyed consisted of culls and drops that would have had no market value.

Created Starvation Period

The next step was to eliminate the flies remaining in the infested district and prevent their migration. It was decided to attempt this by creating during the summer a starvation period within the infested and protective zones. The plan involved the complete elimination of all host fruits and vegetables in a stage of growth attractive to the fly and the supplying, in lieu of normal food, of a sweetened poison bait. This method proved effective, and hope of eradicating the fly is largely centered on the method. But it necessitates the cooperation of every resident of the State and the acceptance of material sacrifices. If success is to be achieved, trees or shrubs ripening fruit during the starvation period must be grubbed up or cut down and the growth of host vegetables must be stopped. It is impracticable to remove ripening fruits and vegetables from the infested areas daily or weekly. To give up cherished yard or garden plants and commercial or other plantings in the interest of the citrus industry is a hard requirement, but one that seems absolutely necessary if the fruit fly is to be eliminated.

It became apparent early in June that to carry out an effective clean-up program and to provide for the removal of all host citrus fruits in the orchards within the infested area, would demand a heavy expenditure. Estimates indicated a total cost of $12,300,000 for the first quarter of the fiscal year 1930—July, August, and September, 1929—in which time most of the work would have to be completed. The cost of removing citrus fruit from the infested

zones was estimated at $6,300,000, and the cost of the clean-up and removal of noncitrus fruit in the protective zone at $6,000,000. In addition there were items for administrative and quarantine enforcement, inspection, the certification of products, and research. To meet these needs, which totaled approximately $15,500,000 for the fiscal year 1930, there was available a probable balance of $3,000,000 from the original appropriation, leaving a deficit of $11,500,000.

Expenditures on such a large scale can only be justified by a reasonable assurance that it is possible to eradicate the pest. But the menace to American agriculture would seem to warrant even greater expenditures if the desired end can be attained. The magnitude of the problem led the department to seek advice, both as to the work proposed and as to the possibility of conquering the fly, from a group of leading specialists selected from various parts of the country. In July I appointed a committee of experts consisting of Vernon Kellogg, secretary of the National Research Council, Washington, D. C.; H. A. Morgan, president of the University of Tennessee; T. P. Cooper, dean of the College of Agriculture of the University of Kentucky; Victor R. Gardner, director of the Michigan State Experiment Station; T. P. Headlee, State entomologist of New Jersey; G. A. Dean, head of the department of entomology at the Kansas State Agricultural College; and H. J. Quayle, professor of entomology at the University of California.

These specialists reported that eradication of the pest was not only practicable but an economic necessity. They recommended enlargement of the work under way and modification of the quarantine regulations so as to permit, under a system of sterilization, the interstate movement of citrus fruits from areas which previously had been considered infested. Research in this department had indicated the practicability of control of the larvæ and eggs in the fruit either by refrigerating the fruit to 28° F. or by heating it to some 110°. The committee stated that the sterilization of whole fruit could, in their judgment, be accepted as a substitute for the destruction of the mature crop in the formerly infested areas and would obviate the necessity of removing all citrus and other fruit of the coming crop. The department adopted the committee's report, and revised the fruit-fly quarantine and regulations so as to carry out the program recommended.

Substantial Appropriations Necessary

It is certain that in addition to the funds now available substantial appropriations will be needed to carry out the enlarged program for the remainder of the present fiscal year. Steps have been taken for the presentation to Congress of an emergency item, for the same objects specified in the initial appropriation of $4,250,000. Since it was essential that the program should be started at once, by reallotment I made available to the first quarter of this fiscal year $2,175,000 of the unexpended balance of the funds appropriated for the fight against the fruit fly.

The estimate of necessary Federal expenditures does not include those phases of the work that may possibly be done by the citizens of Florida, such as the eradication of minor hosts, and spraying and clean-up work in commercial and private orchards.

The costs incident to those phases of eradication which relate to production and handling and marketing of commercial crops are to be borne by the growers and the shippers. Certain phases of the work, however, can not be thus delegated. Accordingly the estimate provides that the Federal Government, in cooperation with the State, shall be responsible for (1) supervision of the spraying and clean-up done by owners, (2) the clean-up of wild and noncommercial lands, abandoned properties, etc., (3) the spraying of roadsides, town properties, and wild land, (4) the scouting necessary throughout Florida and other States, (5) the certification of products, (6) the supervision of sterilization, and (7) the enforcement of quarantine regulations.

I have already indicated that, prior to the discovery of the establishment of the Mediterranean fruit fly in Florida, the bulk of the 1928 crop had moved out of the State through normal channels of distribution and diversion, thus carrying the risk of spreading the pest widely. The danger to the Southern States was especially great, particularly as much of the movement was by autotruck, and included lower-grade fruit specially open to the possibility of being infested. The more western States had also been reached by bulk carload shipments of low-grade fruit.

All States concerned were notified of this risk in April, and an immediate inspection was begun by State forces of all Florida citrus fruit within their borders. An interstate conference held at Atlanta on May 16 resulted in more intensive and concerted action. Financial aid was given by the department out of the special fruit-fly appropriation. The State extension services throughout the Cotton Belt States from Texas to Oklahoma eastward were enlisted in the effort to locate and inspect all Florida citrus fruit within these States. This was of tremendous service. The immediate result was the discovery and destruction of 11 shipments of infested fruit distributed in Arkansas, Georgia, Louisiana, North Carolina, and Texas. Instances of infestation were reported from New York and Ohio. Most of the fruit which had moved into these States had been consumed, and the gravity of the situation was further modified by the absence of ripening host fruits at that period in these States. Immediate controls were placed on bulk shipments in April by Georgia and Alabama. This action practically excluded further truck movements from Florida.

Restriction of Shipments

In recognition of the uncertainty as to the extent of the spread of the pest in Florida and as a further protection to other States, Federal action on May 16 eliminated all movement of host fruit and vegetables from Florida into 18 Southern and Western States. This restricted the movement of Florida host fruits and vegetables to destinations in Northern States. Within the Northern States additional restrictions limited the movement of fruit from protective zones to a group of Northeastern States most removed from risk of infestation. A subsequent amendment to the quarantine prohibited reshipment of host fruits and vegetables originating in Florida out of the district into which the original movement was authorized.

Inspection in the Southern States was followed up by surveys throughout the summer covering the peach season in Georgia and Alabama, and generally the fruit season in all these States from Texas eastward, for the purpose of determining whether there had been any local establishment of this pest. It is gratifying to report that so far there is no indication of the establishment of the fruit fly beyond the area designated in central Florida.

The Mediterranean fruit fly has introduced the question of expenditures for its control and eradication on a greater scale than has been contemplated for any other insect pest. The expenditure of $10,000,000 in the corn-borer campaign is the nearest approach. But in that case there was no thought of eradication. It was intended mainly to demonstrate, over parts of five States, that control of the borer was practicable by modification of farm practice. In the case of the fruit fly, the object is eradication. No one who realizes the menace of this fly to our fruit and vegetable industry will question that its eradication is worth any reasonable expenditure. In determining Federal policy in the eradication effort a long look ahead is necessary. Expert opinion has been rendered that eradication is possible. The department would seem to be fully justified in accepting this decision.

The possibility of eradicating the pest is strengthened by the results of the clean-up and spraying work so far carried out in Florida. Fly abundance and fruit infestation have been rapidly diminished, and new records of finding infested fruit and flies have become very few. In fact, for a considerable period there have been no such findings. This does not mean that success is in sight. All methods of discovery applied over such a vast area must naturally be looked upon as only partially effective. It does indicate, however, that control of the pest can be made very effective and gives hope that eradication is not impossible.

Research Work Instituted

Fruit-fly research work was instituted in Florida by the Bureau of Entomology in cooperation with the Plant Quarantine and Control Administration. This work was greatly expanded under the special fruit-fly appropriation. There is need for a further increase in this field. The results so far of immediate service have been (1) the development of a more effective type of poisoned spray to kill the adult flies in orchards, (2) the development of attractants to facilitate the collection of adult flies in orchards or elsewhere to determine presence or spread of the pest, and (3) the development of a fumigant with which to kill adult flies in motor and railway cars, buildings, or other premises.

Another important phase of research is the determination of methods for sterilizing fruit by refrigeration or heat. The department's discoveries in this field should make it possible to utilize, either by movement in commerce or in some type of processing, all fruit not actually infested. Methods have been devised for the disposal of waste and cull fruit, both in bulk from the orchards and as a continuing process in connection with packing houses. Machinery for this purpose has been devised. Methods for bulk disposal were immediately put in use, and greatly facilitated the disposal of the

infested fruit of the crop of 1928–29. Determinations made by the department as to the host relationships of fruits and vegetables in Florida were at once translated into quarantine restrictions or made the basis for the release of articles from quarantine.

EUROPEAN CORN BORER

There was no important change in the European corn-borer situation during the season of 1929. In the New England area there was a slight general increase in abundance, but serious commercial damage occurred, as in 1928, only in a limited district in Rhode Island and in adjacent Massachusetts. In this district, however, there was a notable decrease from 1928 in the abundance of the borer, due to the clean-up of cornstalks by farmers. In 1928 this area in Rhode Island showed an average of 876 larvæ per hundred plants, whereas in 1929, under clean-up methods, the number was reduced to 249. The adjacent area in Massachusetts in 1928 showed 654 larvæ per hundred plants, compared with 230 for 1929.

In the western area, in 1929, the season in general was unfavorable to the borer, there being only a slight increase in its abundance In Michigan there was a decrease. Commercial damage in the western area occurred only in a few small fields along Lake Erie, chiefly in Lucas County, Ohio. Taking this area as a whole, the average number of borers per hundred stalks was 6.65 for 1928 and 7.78 for 1929; in other words, an average of 1 borer to 15 plants. To appreciate the significance of borer population based on the number of larvæ per hundred stalks, it should be noted that the beginning of commercial injury requires from 400 to 500 borers to 100 stalks, or an average of 4 or 5 borers per stalk. Except for the infestation in Massachusetts and Rhode Island, none of these figures indicate even an approach to crop losses. Taken as a whole, the record of the corn borer in the United States still leaves its future economic importance open to question. However, the heavy damage it occasioned over a few years in a limited district in Ontario now largely controlled by better farm methods and the fairly heavy initial damage in a limited district in Massachusetts are indications of the possible menace of this pest to our corn crop. This menace would seem to warrant the control methods which are now enforced to delay its spread, which must continue and which will eventually carry the insect into the main Corn Belt.

Natural Spread of the Borer

The natural spread of the corn borer by flight during the 1929 season was normal, namely, between 20 and 30 miles. Its long-distance carriage and establishment seem to have been substantially prevented by quarantines, notably road controls to prevent the carriage of green or sweet corn out of the infested area.

At 226 road and ferry stations 11,557,755 vehicles were inspected, and 342,772 ears of sweet corn and about 70,000 miscellaneous restricted articles were intercepted. From these some 2,430 borers were taken. All the confiscated material was destroyed or returned to its point of origin. In general, truckers, who normally transport the bulk of corn or similar products, are familiar with the quaran-

tine and cooperate in its enforcement. Between 90 and 95 per cent of the interceptions were made from passenger vehicles with motorists unfamiliar with the quarantine. Cooperation by such motorists has been good. Out of 11,000,000 motorists hailed, less than 1,000 refused to stop.

To detect any outlying points of spread, the States surrounding the corn-borer area are surveyed each fall, particularly along the main lines of motor travel. This survey in 1929 disclosed two fairly distant points of infestation, one in Kentucky on the Ohio River (Oldham County), the other in the southern point of Ohio (Gallia County), also on the Ohio River. Three outlying points were determined in northern New Jersey. These outlying points will be cleaned up in accordance with the previous practice, which in many cases has been successful. In the New England area, a considerable spread eastward along the coast in Maine was determined. There was a gradual approximation of the eastern and the western areas in Connecticut, Massachusetts, and Vermont.

PINK BOLLWORM OF COTTON

The big outbreak in 1927 of the pink bollworm of cotton in seven counties in west Texas, which was determined during the first three months of 1928, and which involved scattered infestation of nearly 400,000 acres of cotton land, seems to have been practically suppressed. Only a single infestation was found in connection with the 1928 crop, and that consisted of only a few bolls in a field near Odessa. This favorable result can be accredited to an intensive clean-up of the entire section, which was made possible by a special emergency allotment of $400,000, and to the fact that conditions during the winter of 1927–28 were unfavorable to the survival of the hibernating larvæ. Similarly unfavorable weather conditions were indicated by the reduction almost to the zero point of the pink bollworm in portions of Arizona and New Mexico, and in the El Paso Valley of Texas. Provision was made by Congress in a joint resolution of May 21, 1928, for the establishment of a noncotton zone, particularly in the seven counties in west Texas referred to, but verbal changes in the appropriation item at the last moment made this money unavailable for use in these seven counties. Enforcement of a noncotton zone, in connection with the favorable winter and clean-up operations which were carried out, would probably have completed the eradication.

The only portion of west Texas which was covered by a noncotton zone was Brewster County. The cotton area of this county is on the Rio Grande in the extreme point of the Big Bend district, and the heaviest infestation occurring at any point in the United States has been in this county. The results of the clean-up and noncotton zone for a single year will be reflected on the crop of the present year, data concerning which are not yet available. The main idea in establishing a noncotton zone in Brewster County was to eliminate the possibility of spread by flight from that region to west Texas and New Mexico. The entire cotton area along the Rio Grande from the Big Bend to El Paso is in contact with Mexican cotton fields and therefore subject to reinfestation annually, a condition

which makes it impracticable to undertake any drastic eradication measures until Mexico can cooperate so that the cotton areas on both sides of the boundary can be cleaned up at the same time. All the areas in west Texas, New Mexico, and Arizona which are still invaded by this pest are under quarantine restrictions requiring the disinfection of the cottonseed at gins, fumigation and compression of lint and linters, supervision of oil mills, and the maintenance of road stations to prevent untreated material from being taken out of the infested areas. These precautions seem to have been effective in preventing spread of the insect to new locations.

GIPSY MOTH

Gipsy-moth infestation in New England, as measured by the acreage of woodlands defoliated, was much more severe in the summer of 1928 than it had been for many years, and the outlook is that the extent of the injury will continue to increase. More than 262,000 acres of forest land were stripped by the pest last year, and a greater acreage of defoliation was found in the summer of 1929.

The spread of this insect to the west is kept under control by the maintenance of a barrier zone about 25 miles wide extending along the eastern boundary of New York State from Canada to Long Island Sound and bounded on the west by the Hudson River. Intensive eradication measures are employed to stamp out all gipsy-moth outbreaks within that strip of territory. The number of infested locations in the barrier zone increased sharply in 1928, more than double that of the previous year. The worst part of the area was in southwestern Massachusetts and northwestern Connecticut and the adjoining portion of New York State, and was caused by spread from moth colonies east of the zone. All these new points in the zone were treated and sprayed; but since many were located in woodland, more intensive scouting of the large forest areas in the zone will be required. The department feels that the inspection of a belt of territory east of the zone and the treatment of all large infestations there is vitally necessary in order to prevent constant reinfestation of the territory that has been cleaned. To undertake such work will require a very substantial increase in this appropriation item.

More Satisfactory Conditions in New Jersey

In New Jersey, where an effort to eradicate completely an outbreak discovered in 1920 has been in progress, the situation is very much more satisfactory. No gipsy-moth infestations were discovered in the State during the last fiscal year except one small colony. The area infested when the pest was discovered in New Jersey nine years ago covered more than 200 square miles, and scouting revealed about 3,000,000 egg masses. The eradication plan adopted at that time by the Federal Government in cooperation with the State provided for the extermination of the pest by means of scouting the infested section and the territory surrounding it, the treatment of all egg clusters of the insect, and extensive spraying operations. This is the largest extermination campaign ever attempted against a forest insect of this type, and the excellent prog-

ress made is highly gratifying. The volume of work required has been gradually reduced, and the completion of the project in New Jersey is expected within the next few years.

Long-distance spread of the insect by the shipment of woody plants and forest and quarry products has been prevented by the enforcement of Federal quarantine regulations requiring the inspection of such products before their movement is allowed. During the past fiscal year 369,044 shipments forwarded to all parts of the United States and Canada were inspected, and 143,484 shipments that had been processed or stored in such a manner that infestation could not be transmitted were moved on permits provided for by the quarantine regulations. On the material offered for shipment, 1,782 clusters or larvæ of the gipsy moth were found. Before movement was allowed the infested material was cleaned.

The discovery and stamping out of many small colonies in this barrier zone, reinforced by the inspection of products to be shipped from the infested territory, have protected all sections of the United States from the permanent establishment of this pest, at expenditures which are small in comparison with the continuous losses that have been prevented.

JAPANESE BEETLE

Since the promulgation of the first Japanese-beetle quarantine in 1919, the area under regulation on account of this insect has increased from 48 square miles to 21,353 square miles, and now includes New Jersey, the District of Columbia, eastern Pennsylvania, northern Delaware, and small portions of Connecticut, New York, Maryland, and Virginia. The most isolated point of known infestation is 192 miles by air line from the center of the heavily infested area. Despite this apparently enormous increase in area, the annual spread by normal flight of the beetle of from 10 to 15 miles over a period of 11 years is largely responsible for the present distribution. The quarantine which is being enforced on account of the Japanese beetle has as its principal purpose the prevention of long-distance spread of this pest through the movement of nursery stock and farm and garden products. This purpose seems to have been fully achieved.

There is, however, in addition to local spread by flight, another type of movement which it is impracticable to attempt to control in view of the congested population in the area now reached by the beetle. This is accidental carriage by motor or train movement through the Japanese-beetle area during the period of beetle abundance. A number of isolated points of spread have been determined during the last two years which are believed to have resulted from such accidental carriage by motor or train. Most of these points, determined in 1927 and 1928, are within 50 or, at the outmost, 100 miles of general Japanese beetle infestation. With respect to such points, the department has approved the policy of treating them as separate control units rather than including them by a broad extension of the quarantine lines in the general quarantined area. This mode of treatment necessitates cooperation by the States concerned, and it is in accord with policies which hitherto have been followed in connection with other plant quarantines; namely, such quarantines as those on account of the gipsy moth, the corn borer,

and the pink bollworm. To include such isolated points under the general quarantine would immediately open extensive areas in the States concerned to the uncontrolled movement of nursery stock and farm products, with the result of establishing the beetle more or less quickly throughout such areas.

Results from Beetle Traps

The use of beetle traps at Baltimore, Washington, and in Alexandria County, Va., has resulted in the collection of great numbers of beetles. The possibility of substantial control at such isolated points by this method will thus be given a fair demonstration this year. That enormous quantities of beetles can be collected by the trapping method has been fully demonstrated. In fact, on a single property in New Jersey nearly a ton of beetles were thus collected during the current season. In the generally infested areas, however, such trapping is of little value, even in instances like the one cited, unless the employment of this method is general. Otherwise the placing of numbers of traps on individual properties will have the unfortunate effect of attracting enormous numbers of beetles to such properties from adjacent land. This objection, however, does not apply to isolated points.

The new outlying points at which the Japanese beetle has been found during the present summer include Boston, Mass., Providence, R. I., and Norfolk and Cape Charles, Va. It seems reasonable to infer that the beetle reached these places by the movement of boats from Philadelphia during the height of the season, aided possibly also by accidental railway carriage.

Within the present area regulated on account of the Japanese beetle there are over 4,000 nursery and greenhouse establishments. These comprise the principal and most extensive nursery operations in the country. More than 1,000 of these regularly ship quarantined nursery and ornamental stock from the restricted zone to all parts of the United States and various foreign countries. The enforcement of the quarantine regulations has accordingly grown to considerable magnitude, involving the yearly certification for interstate movement of 73,000,000 plants. To avoid risk of such plants being the means of long-distance carriage of the beetles in the larval stage, plants from nurseries determined as infested are either required to be shipped free from soil, or soil balls with the plants are given a chemical treatment which, without injuring the plants, will destroy the larvae. Under one or the other of these conditions all types of plants are permitted movement from infected nurseries or districts. In addition, the effective enforcement of the quarantine requires the supervision of shipment of thousands of carloads of sand, soil, peat, and manure.

Asiatic-Beetle Distribution

The present distribution of the Asiatic beetle covers a considerable area in northern New Jersey and the southern point of New York, with outlying points of infestation, respectively, at Albany, N. Y. (a determination of this year), New Haven, Conn., Harrisburg, Pa., and the District of Columbia. These beetles are somewhat closely re-

lated to the Japanese beetle and correspond also with the latter more or less in larval and adult habits. The economic importance of these beetles is largely, however, in their capacity to injure and destroy lawns and grasslands. This is particularly true of the so-called Asiatic beetle, but also applies to the Asiatic garden beetle, which latter, however, is, in the adult stage, an active leaf feeder and attacks a large range of ornamental and crop plants. The Asiatic beetle has demonstrated, at points where it has gained a foothold, a capacity to destroy lawns beyond that of the Japanese beetle or any of our native species. In New Haven, according to the State entomologist, upwards of $100,000 has been spent in a few years for the replacement of lawns destroyed by the Asiatic beetle in an area of infestation comprising only a small section of that city. Both of these beetles have invaded important nursery districts; and quarantine restrictions are especially necessary, therefore, to prevent their distribution widely in the United States with plants shipped with untreated soil. This need is emphasized by the fact that large numbers of the white grub of this insect, in which stage it passes the fall, winter, and spring, have been found in earthballs about plants coming from infested premises.

The research work which has been conducted with respect to these beetles has developed means of disinfecting the soil which must go with certain types of nursery stock, and the movement of all nursery stock is provided for either under such treatment or when freed from soil. Local and other grasslands can also be protected from these bettles by arsenical poisoning, but this is a very expensive treatment which must be repeated at intervals.

RESEARCH IN ENTOMOLOGY

Research carried on by the Bureau of Entomology in connection with the newly imported pests of major importance discussed in the foregoing pages in regard to biological, environmental, and host relationships has gone hand in hand with the control and eradication efforts, and the results of this research form the substantial basis for such efforts. This research has covered every relationship of the insect to the plant and to farm practice, including the development of special types of farm or other machinery to make control inexpensive and possible by means in line with ordinary farm practice. It has covered also all the means of repression by use of poisons, gases, traps, etc., and has included the importation of natural enemies from the foreign countries of origin of these pests and the establishment of these natural-control aids here. This latter field is one of the greatest interest and importance because it eventually should bring about in this country the balance which exists in the countries of origin and which in most cases greatly limits the losses due to these pests or makes their recurrence infrequent. In the case of the corn borer, the Japanese beetle, and the gipsy moth particular effort in this direction has been made, and many thousands of parasites of different types have been introduced, and many of these have been successfully established. The beneficial results from such establishment are now beginning to show in the reduction of damage in the older and originally the most heavily infested centers.

UTILIZING FARM BY-PRODUCTS

Increased attention has been given by the department in the last year to the problem of utilizing agricultural by-products. In gross tonnage by-products constitute more than 60 per cent of the material annually produced from the soil. Though industrial uses have been found for some of this material, much further progress in this direction seems possible.

The principal farm by-products are cornstalks, corncobs, cereal straw, oat hulls, cotton stalks, cottonseed hulls, flax straw, peanut shells, and sugarcane bagasse. These materials are of course not wholly wasted at present. Their value as feed for livestock or as fertilizer is considerable. The industrial utilization of farm by-products is economically sound only when the prices paid for them to the farmer represent a greater value to him than the by-products would have if left on the farm. It has been demonstrated, for example, that on some soils under specially favorable conditions a ton of cornstalks, when plowed under, may have a fertilizer value of from $5 to $6.

In considering the commercial advantage of selling cornstalks the farmer must reckon the cost of buying, hauling, and applying the fertilizer which would be necessary to replace the stalks. He should also include a reasonable profit for the extra effort required. Chemical science and economic development may eventually make cornstalks and similar farm by-products worth more as cash crops than they are as feed or fertilizer. Meantime, the necessity of meeting this requirement should not be forgotten. The prospect that it may eventually be met with an ample margin, on a considerable part of our farm by-product output, is suggested by the progress already made.

Cull fruits and vegetables constitute a heavy annual waste. Sweetpotatoes alone, it is estimated, are culled to the extent of 20,000,000 bushels annually and potato culls amount to 76,000,000 bushels a year. Cull apples probably average 35,000,000 bushels annually, and similar large wastage of other fruits and vegetables takes place. Scientific and industrial progress which permits the utilization of these by-products constitutes at once a strong influence for agricultural improvement and an important means of conserving the Nation's resources. It is gratifying to be able to report, therefore, that experiments in the department have found economic uses for some crop materials formerly wasted and have laid a foundation for future economies of the same nature. A brief recital of what has been accomplished and some reference to the more promising of the investigations now under way should be of interest.

Farm Wastes Classified

Farm wastes may be classified under three main heads—namely, crop by-products, unsalable crop surpluses, and by-products of industrial operations upon agricultural raw materials. In the first group are included hulls, cobs, stalks, straws, etc. In the second are culled fruits and vegetables; and in the third, products that, while not without utility, may lack a profitable market. Chemical

research combined with a study of economic problems is the key to the utilization of these wastes. It is of course obvious that the problem of utilizing farm by-products is not merely a matter of discovering means of turning them into usable materials. It is also necessary to determine whether this can be done profitably, when full allowance is made for gathering, transportation, storage, and other costs. It is not sufficient, for example, to develop a process for making paper or fiber board from straw or cornstalks. Means must be found for doing so at a cost that will enable the product to compete with paper or fiber board manufactured from other materials. Thus the problem is twofold—(1) chemical, and (2) economic. The economic phase of the problem may require much practical experimentation, perhaps during many years, and may possibly also involve large-scale production. Industrial operations that are uneconomic on a small scale may be profitable on a large one.

Important results have been obtained from studies of the utilization of the cellular materials of crop by-products. These materials consist chiefly of cellulose, lignin, and carbohydrates. Dry cornstalks, for example, consist of approximately 36 per cent cellulose, 30 per cent lignin, and 27 per cent carbohydrates. Cellulose is the fibrous part of the plants and represents about one-third of the dry matter of vegetation.

As far back as 1908 mill-scale experiments were conducted by the department in making paper from the cellulose of farm by-products, especially cornstalks, broomcorn, sugarcane bagasse, rye straw, cotton-hull fiber, cotton stalks, flax straw, hemp hurds, etc. These investigations showed that excellent white paper can be made from bagasse, straw, and cornstalks. One commercial mill is now making insulation board from wheat straw, and two others are developing processes for manufacturing board from cornstalks. Another mill is producing bleached pulp from cornstalks. These industrial enterprises resulted largely from early scientific investigations conducted in the department and by other interests, and may eventually open up important new markets for the cellulose contained in crop by-products.

Experiments on Commercial Scale

The practicability of using by-products from farm crops for paper making on a commercial scale has not yet been fully demonstrated, though encouraging experiments are under way. Fiber board is produced profitably from sugarcane bagasse. Under certain conditions unbleached wrapping paper and board may be produced profitably from straw. Approximately 500,000 tons of straw were used for this purpose in 1927. Insulation board is now made commercially from straw and cornstalks, as well as from bagasse. Cellulose from wood is now the chief raw material for paper, fiber board, insulation board, etc., but our wood supply is decreasing at a rate which indicates that other raw materials for paper and board making will eventually be in demand.

Important results have been obtained by the department in the distillation of straw and similar by-products. In tests made at a

full-size gas-producing unit on the department's farm at Arlington, Va., it was demonstrated that gas produced from straw may be used for lighting and heating and as a motor fuel. As yet this can not be done profitably on the individual farm. Commercial experiments, however, have indicated that this work may eventually have significant industrial consequences. An inviting field is the production of alcohol and acids from cellulose wastes. Investigations in this country and Europe have shown that alcohol, acetic acid, and acetone may be produced from straw and similar materials.

Research on lignin in the department has yielded results of exceptional significance. Lignin constitutes from 20 to 30 per cent of the dry material found in hulls, straw, and leaves. It is a complex material with many industrial potentialities, possibly equaling those brought to light a century ago by experiments with coal tar. The Department of Agriculture has utilized lignin in making varnishes, dyestuffs, and various aromatic chemicals. It has produced synthetic resins by combining lignin with aromatic amines and has obtained acetone, methanol, acetic acid, guaiacol, and eugenol from lignin. Research work on furfural in the department has led to the commercial production of this chemical compound at prices only a fraction of those prevailing before the work was started.

Furfural is a liquid obtained by the action of steam and acid on pentosans, an important carbohydrate constituent of some crop by-products. It is commercially used as a substitute for formaldehyde in the preparation of artificial resins of the Bakelite type, and also as a solvent, a purifier of rosin and anthracene, a paint and varnish remover, an intermediate in the production of dyes, a repellent for the blowfly, and a possible intermediate chemical in the production of pyromucic acid. It is being made commercially from oat hulls and is reported to be selling in tank-car lots at from 10 to 12 cents a pound. This price may be compared with $30 a pound in 1918, when the department's furfural research work began. In producing furfural from oat hulls, corncobs, and other farm wastes certain by-products are elaborated which can be used in making corrugated-fiber containers and in the productin of coal briquettes. As yet utilization of these by-products is in only the development stage.

New Uses for Sweetpotatoes

Investigations are under way in the department in the technology of converting sweetpotatoes into commercial products. In some seasons a large part of the sweetpotato crop is classed as cull and finds no profitable market. Approximately 20 per cent of the crop may be too large or too small, or unmarketable for some other reason. In addition, surplus sweetpotatoes are often a problem. When growing conditions are exceptionally favorable the yield from a normal acreage may exceed the demand. Semicommercial experiments are now being conducted in the manufacture of starch from sweetpotatoes at the department's Arlington Experiment Farm. Excellent starch has been made in this way and commercial methods of manufacture are being developed. A commercial sweetpotato starch plant has been erected in Louisiana. Sweetpotato starch may possibly prove an acceptable substitute for tapioca and sago starch,

the raw product from which high-grade dextrin and adhesives for postage stamps and envelopes are made. This country imported about 116,000,000 pounds of tapioca and sago products in 1927. If starch from sweetpotatoes can be substituted for starch from imported tapioca and sago, the demand for sweetpotatoes should be increased by some 18,000,000 bushels. Dried sweetpotato flour is also valuable in bread making. Heretofore unmarketable sweetpotatoes have been largely fed to hogs. Compared with other root crops, they are rich in the proteins essential for growth and nutrition, and are valuable as a supplementary feed.

Overproduction of potatoes is frequent enough to indicate the urgent necessity of industrial utilization of the surplus. Overproduction, however, tends to alternate with underproduction, so that industrial concerns utilizing potatoes might not be sure of a continuous supply. In Germany manufacture of starch from potatoes is an established industry. In fact, practically all the commercial starch produced in Germany, Poland, Holland, and some other European countries comes from potatoes. Methods of similarly utilizing surplus potatoes in the United States are under consideration in the department. Research on the industrial utilization of potatoes is going forward along many lines, including the manufacture of potato starch, potato dextrin, potato flour, dried stock feed, and potatoes as a source of industrial alcohol for motor fuel. The possibility of utilizing the same plants for the manufacture of both sweetpotato and potato starch is being studied. This can be done in localities where both crops are grown. Attempts to utilize potatoes and sweetpotatoes are not being restricted to starch production alone, but include the production of modified starches, dextrins, etc.

Industrial Uses for Corn

Numerous industrial uses for corn have been developed in line with research work originally launched in the Department of Agriculture. Formerly cornstarch for cooking and laundering was about the only industrial product made from corn. Private scientific investigations then showed how a sirup and a sugar could be made from cornstarch and the by-products of starch manufacture converted into valuable products. To-day, from the waste of the corn kernel after the starch is removed, the industrial chemist produces corn gluten, a highly valuable feed; from the germ of the corn he obtains corn oil, an edible oil now largely used in salads and for cooking. Large quantities of corn are now annually consumed in the corn-products industry. Progress has also been made in finding additional uses for other cereals, as well as for fruits and vegetables that might otherwise go to waste.

Processes developed by the department for the dehydration of fruits and vegetables have been helpful to the dehydration industry. In Idaho and Washington commercial dehydration plants use these processes, or developments thereof, for the drying of prunes and of surplus apples. Some success has attended commercial developments in New Orleans, Chicago, and Niagara Falls in the dehydration of vegetables. Sweet corn is dried commercially in Pennsyl-

vania and Ohio. Dehydration as a method of food preservation has great possibilities, but research is necessary to develop means of retaining the color, the flavor, and the vitamin content of fruits and vegetables, and also to devise effective methods of packaging, etc. The department has temporarily dropped its researches on dehydration problems, since Congress has not continued the appropriation for the work.

Utilization of farm by-products for the production of alcohol for motor fuel and for other industrial purposes has important possibilities. Surplus corn, surplus potatoes, and materials rich in starch generally are potential sources of alcohol, and methods of obtaining it have been investigated in the department. The practicability of using alcohol as a motor fuel has been demonstrated. Chemical and automotive engineers have solved the technical problems involved, and the commercial utilization of alcohol for fuel is now wholly an economic problem. Should scarcity raise the price of gasoline to a parity with the cost of producing alcohol, the latter product will probably become a motor-fuel competitor of gasoline. At present by-product molasses is largely used in the manufacture of industrial alcohol, but there are many other possible sources, especially cull and surplus fruits and cannery wastes.

Gossypol Poisoning Danger Nonexistent

Recent work in the department, which elaborates and verifies previous studies made by State experiment stations, should increase the commercial utilization of cottonseed meal. It has been shown that the supposed danger of gossypol poisoning from the use of cottonseed cake meal as feed for livestock does not exist. When properly treated and refined, cottonseed meal is a useful feed, though its protein alone is not adequate for optimum growth and nutrition. This shortcoming, however, may be corrected by the addition of other feeds. In the past, because of its presumed toxicity much cottonseed meal has been used as fertilizer. With a better understanding of the proper use of this product in feeding livestock the demand for it should greatly increase. Cottonseed, formerly almost wholly wasted, now is worked up into products having a yearly value estimated at more than $250,000,000. Rayon is manufactured from linters, the fuzz on the seed.

Experiments conducted in the department indicate possibilities in the utilization of peanut shells in floor-sweeping compounds, in dynamite, and in linoleum. Peanut shells are a possible source of alpha cellulose, the basic substance in the production of rayon. Chemists in the department have produced a beautiful alpha cellulose from peanut shells, though the product lacks certain physical properties necessary in the profitable production of artificial silk. Further research may correct this defect. Paper board comparing favorably with commercial wall board has been made experimentally from peanut shells. Peanut meal has been demonstrated to be valuable as a feed supplement, and peanut flour combined with wheat flour makes a nutritious and palatable bread.

Grease and Potash from Raw Wool

In cooperation with wool growers the department has developed improved methods of recovering and utilizing the grease and potash contained in raw wool. Heretofore a large part of the by-products of wool scouring has been disposed of as sewage at a total loss. The possibility of eliminating this loss is now indicated. Other studies have shown that crude wool grease when properly refined is useful for currying leathers and waterproofing canvas. Further study may develop new uses for it.

Many by-products of the farm and of the forest are actual and potential sources of tannin, an essential material in the manufacture of leather goods. Studies in the department have laid the foundation for the development of new supplies of tannin through the utilization of miscellaneous plant products and wastes. This work holds great possibilities in view of the fact that the present source of more than one-half our domestic supply of tannin is the American chestnut tree, which seems doomed to extermination by the chestnut blight.

FARM FIRES

The farmer loses a material part of his annual income by fire. It has been estimated that fires on farms annually take a toll of about $100,000,000 worth of property. At the request of the National Fire Protection Association, the farm insurance organizations, and other interested agencies, the department has undertaken a study of the causes of farm fires and of means of preventing them.

Special attention is being given at this time to spontaneous heating of farm products, which causes annual losses amounting to millions of dollars. These losses take two forms—namely, actual fire and spoilage of stored products by overheating. In 1927, according to the National Board of Farm Underwriters, farm-fire losses from unknown causes on property insured by its member companies amounted to $12,151,314, and it seems probable that a substantial part of these occurred from spontaneous ignition. Corresponding figures are not available for the far larger part of the farm property which is insured in farmers' mutual fire insurance companies or for that part which remains uninsured. Other causes of farm fires are lightning, defective chimneys and flues, sparks on combustible roofs, matches and smoking, careless use and storage of gasoline and kerosene, and faulty electrical wiring.

Improperly cured or damp hay (especially the legumes), when stored in large masses, or hay which has become wet subsequent to storage, is particularly subject to spontaneous or self-generated heating. Under certain conditions, as yet undetermined, this heating will progress until spontaneous ignition occurs. The Bureau of Chemistry and Soils of this department is studying the chemical, bacteriological, and engineering aspects of this problem. Laboratory research and also large-scale field experiments are being conducted on the department's farm at Beltsville, Md. Hay in storage is being studied under conditions believed to be ideal for spontaneous heating, and also duplicating as nearly as possible the conditions on

farms. The results obtained should yield fundamental data, together with information on practical measures to reduce farm-fire losses.

FERTILIZER PRACTICE

The commercial-fertilizer industry has been going through a gradual but distinct evolution during the past 10 or 15 years. There has been a constantly increasing use of inorganic fertilizer materials, a tendency toward the elimination of low-grade fertilizers, and increased use of synthetic fertilizer salts. These changes are fundamental. Greater use of inorganic materials means that the fertilizer industry is becoming a chemical industry. Formerly it utilized to a large extent the by-product materials of the packing house and mill. Remarkable progress has been made recently in the development of synthetic fertilizer materials, notably in the fixation of atmospheric nitrogen.

These new nitrogen materials are characterized by high plant-food concentration. New compounds of phosphoric acid have been developed which contain high percentages of this food constituent. Potash salts of high potash content are available, and there has been rapid development of concentrated fertilizers containing 30 or more per cent of available plant food. The department, in cooperation with a number of the State agricultural experiment stations, is conducting a wide range of experimental work to compare concentrated fertilizers with ordinary-strength fertilizers on prominent soil types. If the farmer can satisfactorily utilize this concentrated material, considerable savings in freight, handling, hauling, and other items will result.

In sections where the soil has good water-holding capacity and rainfall is adequate concentrated fertilizers show up well in comparison with those of ordinary strength. On light sandy soils in the coastal plain section, where rainfall may be scanty at and following planting, more experimental work is required as to the placement and distribution of concentrated fertilizers and as to the degree of thoroughness with which they should be incorporated with the soil. It will not be practicable to make definite recommendations until this work has been done.

It is necessary also to develop fertilizer-distributing machines with suitable attachments to insure the proper application and incorporation of the fertilizer with the soil. In some sections, where large quantities of fertilizer are applied to the acre, the use of concentrated fertilizer has passed the experimental state, and farmers are discovering its advantages. On crops which ordinarily receive only a few hundred pounds of fertilizer to the acre, ordinary-strength fertilizer will probably continue to be used, as it is more easily applied uniformly.

Chief Plant-Food Elements

The chief plant-food elements around which experimental field and greenhouse work has heretofore been largely centered are nitrogen, phosphorus, potassium, calcium, magnesium, sulphur, carbon, hydrogen, oxygen, and iron. In fact, the fertilizer industry has

been developed on the principle that nitrogen, phosphorus, and potassium are the key plant-food elements. As a result, the industry has largely confined itself to the production of fertilizers containing mixtures of nitrogen, phosphoric acid, and potash carriers. Inquiries have recently arisen concerning some of the less common soil elements. These include manganese, magnesium, boron, iodine, fluorine, copper, iron, chromium, vanadium, titanium, etc. Studies are under way to determine whether deficiencies of one or several of these rarer elements may interfere with plant growth and development. The subject is of considerable importance. Preliminary experiments indicate that a small application of certain of the so-called minor elements of plant food is an advantage. The effect of manganese on a highly calcareous soil in Florida, where tomatoes are commercially grown, is a striking example. On this soil the difference between success and failure may be determined by the use of manganese compounds. As light an application as 50 pounds of manganese sulphate to the acre prevented chlorosis, stimulated vegetative growth, and insured commercial growers a successful crop.

Deficiencies of the less common soil elements may also prove detrimental on light sandy soils, such as are found in the Atlantic and Gulf coastal plains regions. This is particularly true of soils that are subject to constant leaching. There is some evidence that the continued use of relatively pure synthetic salts in fertilizers on certain soils may prove detrimental, owing to the absence of impurities which, in ordinary fertilizers, supply some of the less common elements. The questions involved deserve thorough investigation under field conditions.

FOOD AND DRUGS ACT

The enforcement of six laws designed to keep our markets free from adulterated and misbranded foods, drugs, insecticides, and naval stores has done much to advance the interests of farmers and ranchers. These laws—the food and drugs act, the tea act, the insecticide act, the naval stores act, the import milk act, and the caustic poison act—are enforced by the Food, Drug, and Insecticide Administration, a regulatory unit of the department established for that purpose on July 1, 1927, by act of Congress.

The economic advantage to country and town buyers alike of being protected against traffic in foods and medicines that are not what their labels represent them to be has been pointed out in previous reports. The application of the food and drugs act to the sale of stock foods also guards the farmer against having to pay high-protein feed prices for feed of low-protein content, and the application of the insecticide act insures truthful statements on labels for the insecticides and fungicides used throughout the country in the producers' war against insect pests and fungous diseases.

Perhaps the most outstanding accomplishments of the year under these acts, so far as the farmers' and ranchers' interests are concerned, however, have been the changes effected in the claims under which veterinary preparations and insecticides for use on livestock and poultry are offered for sale. Many of these preparations, of course, have always been put out by honest and painstaking manu-

facturers, who saw to it that no promises that could not be fulfilled appeared on the labels or in the circulars accompanying the packages of their products. But unfortunately many others were sold under claims for cures that could not possibly be accomplished by any of the ingredients used. The best example of what has been done against such preparations is the action taken some time ago against an alleged cure for contagious abortion, found on analysis to consist of nothing more than brown sugar and wheat bran. Nine and one-half pounds of this "cure," which cost less than 40 cents to produce, was sold for $5. Seizure, under the food and drugs act, of shipments of this product throughout the country resulted in its removal from the channels of trade. The manufacturers claimed that their sales amounted to about $15,000 each month before the Government took a hand in the matter. Putting an end to this fraud alone saved dairymen at least $180,000 a year.

Present-day reliable veterinary medical opinion holds that no known drug or mixture of drugs can be considered efficacious in the treatment of such diseases as contagious abortion of cattle, hog cholera, hog flu, fowl cholera, diarrhea of chicks, coccidiosis, roup, gapes, chicken pox, blackhead of turkeys, distemper of dogs, black tongue and running fits of dogs, influenza, distemper, and heaves of horses. In spite of this well-established fact, preparations prescribed for use in such affections are constantly being put out. As a result of an intensive campaign under the food and drugs act, the greater part of these alleged remedies, which a few years ago flooded the market, have either been entirely withdrawn or have had their labels and circulars so changed as to prevent their being bought under misapprehension of what they can really do.

Action in Regard to "Worm Expellers"

The great array of "worm expellers," "mineral mixtures," "stock powders," "conditioners," and "tonics," offered to the agricultural public under false and fraudulent claims, have recently come under the ban of the law. For instance, drastic action was taken against a preparation labeled "Worm Eradicator," when chemical analysis showed that it contained approximately 95 per cent of water and 5 per cent of material utterly worthless against worms of any type in poultry or any other animal.

The sale of preparations to be administered internally to poultry afflicted with lice and mites constitutes another fraud against which the department has proceeded, in this case under the insecticide act. Court action was taken, and a verdict for the Government rendered, against a preparation for which the manufacturers claimed that one-half teaspoonful in each gallon of drinking water provided for poultry would rid the fowls of all lice and mites. Chemical analysis showed that this product consisted of about 8 per cent of lime and sulphur and 92 per cent of water. Entomological examinations showed that it would kill neither lice nor mites.

American farmers and ranchers annually spend millions of dollars on veterinary preparations of one kind or another. Unless such preparations will do what their manufacturers say they will, this expenditure is a great financial loss. Even more serious than the loss of good money, however, is the false sense of security thus

attained, leading, as it often does, to the spread of a disease throughout an entire community before proper scientific methods of control are begun. The need for legal action to prevent fraud of this sort will doubtless continue indefinitely; rapid strides, however, in ridding our markets of falsely labeled veterinary preparations have recently been made through cooperation with the industry. Manufacturers are showing an increasing desire to comply with the spirit as well as the letter of the law by voluntarily removing misbranded preparations from the channels of trade and revising their labels and circulars to eliminate all claims that are not fully warranted by the composition of their products.

PLANT-INDUSTRY DEVELOPMENTS

Postwar agricultural developments emphasize the necessity of systematic effort to regulate farm production in accordance with market needs. This calls for a determination in advance of the acreage required. Any such determination can of course be only approximate, since production depends not on acreage adjustments alone but also on the weather and on other unpredictable influences. Yet acreage adjustments are extremely important. The annual variation in the outturn of some leading crops is mainly dependent on annual variations in acreage. It is imperative, however, if acreage adjustments are to serve their purpose adequately, that the crops grown shall be well adapted to their climatic and soil conditions, and also reasonably immune or resistant to pests and diseases. Production can be better influenced through acreage changes when the varieties planted may, under normal conditions, be relied on for reasonably stable performance.

Overproduction, with resulting low prices, may follow underproduction due to regional crop disasters. Such disasters, though frequently the result of climatic conditions, are by no means always thus caused. They may be due largely to the ravages of insect pests or plant diseases. Research and experiment in the Bureau of Plant Industry of the department have developed many important plant varieties with disease and pest-resistant qualities. Such dependable varieties may play an important rôle in efforts to stabilize production. In fact, the reduction of seasonal hazards in this way has already contributed much to the better adjustment of supply to demand relationships. A glance at what has been accomplished will illustrate the principle involved.

Hazards in wheat production under dry-land conditions, for example, have been much reduced by the introduction of hard red winter wheats from Russia and by the development therefrom of improved pure lines or hybrids such as Kanred, Oro, Regal, and Newturk. Drought-resistant and rust-resistant varieties of durum wheat are a factor in stabilizing production in the northern part of the Great Plains. In the Pacific Northwest average acre yields of wheat have been increased about 3 bushels without appreciable additional cost, by the application of the department's discovery that early plowing of stubble for summer fallow is valuable. Rust losses in the North Central States have been much reduced by the eradication of more than 17,000,000 barberry bushes. In the eight years from 1921 to 1928, inclusive, average annual losses from rust in this

region were only about one-third of what they were during the 6-year period 1915–1920. In the dairy belt oats production per acre has been increased by the development of pure-line varieties. Cereal smuts have been much reduced through the development of fungicides.

Control of Seed and Soil Borne Organisms

In the Corn Belt success has been achieved in the control of numerous seed and soil borne organisms that cause rots in the stalks, roots, and ears of corn plants. Soil treatments have been developed for lessening the harmful influence on the corn plant of iron and aluminum in the soil. Field practices have been developed that prevent severe injury to young flax from heat canker. States where flax culture had been abandoned have resumed the production of that crop as a result of the development by the bureau of wilt-resistant varieties. Research on the wheat nematode resulted in the control of this pest, and research on flag smut of wheat ended in the practical extermination of the disease.

Cane-sugar production in Louisiana, which was threatened with extinction by mosaic disease, has been rehabilitated by work done in the department. Unofficial estimates of Louisiana's 1929 sugarcane area place it at 225,000 acres. This compares favorably with the acreages grown before the appearance of mosaic disease. This disease was discovered in 1919 in a small area in the eastern part of the State. For three years its harmful effect was little noticed. Thereafter, however, the disease spread rapidly through Louisiana and other sugarcane-growing States. In 1926 the yield from 128,000 acres in Louisiana was only 47,000 tons of sugar. It was evident that the varieties of cane then grown could no longer be relied upon for the production of sugar and sirup. Great areas of cane lands passed out of cultivation. Sugar mills remained idle, and the sugarcane industry faced collapse.

Mosaic-Resistant Cane

Following a survey, the Department of Agriculture imported varieties of sugarcane known to be tolerant of the mosaic disease. These varieties, propagated from cuttings, occupied one-fourth of the sugarcane acreage in Louisiana in 1927. In that year 71,000 short tons of sugar was produced from 73,000 acres. In 1928, 175,000 acres were planted to sugarcane in Louisiana, approximately 135,000 acres being planted to the new varieties. It is estimated that cane from 200,000 out of the 225,000 acres planted this year will be available for the production of sugar. Disease-tolerant varieties of cane have also been established in the sirup-producing areas, where they are rapidly replacing the old varieties. Thus, in a few years a threatened industry has been reestablished upon a sound agricultural and economic basis through scientific knowledge. Further improvement of sugarcane varieties is expected from experiments with new types of breeding stock obtained in an expedition to New Guinea. In this expedition the department's plant explorers visited hitherto inaccessible regions by airplane.

Soybean production has increased tremendously in the United States during the last decade, and about half of the gain is traceable to the introduction of improved varieties by the Department of Agriculture. These varieties are adapted to a range of conditions quite beyond the possibilities of the varieties previously grown. They have made the production of soybeans more certain and more profitable and soybeans have been usefully substituted for other staple crops with which they do not compete directly from the standpoint of consumption. With the corn-borer menace in corn production, soybeans may become a still more important stabilizing factor in the agriculture of the Corn Belt. Sudan grass, introduced from Africa in 1909, is now grown to an amount exceeding $15,000,000 in value annually. Alfalfa production has been much increased through the development of hardy strains. The area in alfalfa in 1928 in the States from Wyoming and Montana to the Atlantic coast exceeded 5,651,000 acres, as compared with only 3,179,000 in 1919.

Sorghums introduced by the department have done much to stabilize agriculture in the semiarid regions. In 1928 more than 10,000,000 acres [1] of sorghums were grown in the United States, chiefly in the southern Great Plains. This crop provides the wheat farmer of the semiarid regions with dependable feed, both grain and forage. In the Southern States the department encourages the improvement of pastures by disseminating information about Bermuda grass, carpet grass, Dallis grass, and Lespedeza. It has introduced Bahia grass, centipede grass, and Korean Lespedeza into this region. These grasses, when properly cared for, provide pastures in the Southern States equal in carrying capacity to the best bluegrass pastures of the Northern States. This is a contribution of great value to the livestock industry of the South, which requires improved pastures as a basis for needed expansion.

Asparagus Growing Protected

Disease-resistant strains or types of asparagus developed in the department have saved a menaced industry. Asparagus rust and the losses resulting therefrom have thus been much reduced. The strains developed in the department, besides being resistant to rust, are superior in vigor, size, and tenderness to the stocks formerly planted. Much of the risk in tomato production has been eliminated by the development of improved varieties in the department. A number of varieties highly resistant to certain diseases and superior in table quality are now commonly grown. Stem-end rot of watermelons, formerly a serious factor in transportation to market, can now be reduced to a negligible degree by simply disinfecting the cut end with Bordeaux paste. Average yields of potatoes have steadily increased in recent years as a result of the increased use of disease-free seed and high-yielding strains. In 1928 the average acre yield of potatoes in the United States was 121 bushels, as compared with 98 or 99 bushels prior to about 1920. Through better seed and better pest control, growers have acquired increased power to regulate their output.

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[1] This figure includes estimates for a number of States for which detailed figures are not available.

In accordance with experimental results showing the importance of prompt cooling of fruit for satisfactory shipment, a portable car-precooling apparatus has been invented and made available for use throughout the fruit districts of the United States by securing a public-service patent. The device was designed primarily for highly perishable fruits, such as strawberries and peaches, and has been used with much success in conditioning car lots of strawberries and peaches in the South. The principle on which this apparatus works is to reverse the natural air circulation of the refrigerator car, utilizing small motor-driven blowers to pull the air into the ice bunkers through the bottom bunker opening up through the ice and out into the body of the car on top of the load. With this apparatus cars may be loaded according to standard practice and precooling accomplished without disturbing the load during or after cooling operations. When it is considered that the more rapidly a highly perishable commodity can be cooled after harvesting, the greater the possibility of the storage period being extended, it is reasonable to assume that the precooled commodity can be transported and remain in good condition a greater distance than a nonprecooled commodity.

Losses Reduced in Handling Oranges

Losses from decay or oranges in transit have been much reduced through the department's discovery that blue mold can be prevented by handling the fruit so that the skin will not be injured. Much advantage has resulted from the standardization and improvement of varieties. The Valencia variety of California is now produced in a quantity nearly equal to that of the Washington Navel. As the navel orange is shipped during the winter months and the Valencia in the spring, the two varieties furnish a comparatively uniform and constant supply from California throughout a large part of the year, to the advantage of growers, shippers, and consumers. In Florida, growers have almost unanimously adopted a list of four or five oranges that ripen in sequence during the Florida orange season. Production of Satsuma oranges has been made more profitable by a treatment whereby fruit that is green, though fully ripe, can be turned yellow. Much of the Satsuma orange crop attains prime eating maturity while the skin is still leaf green. In this condition it is unmarketable because of its color. Subjecting the fruit to a certain gas destroys the green pigment, and the desired yellow or orange color becomes dominant. In this way the fruit can be marketed when in its best condition for eating and when there is relatively little competition from other varieties.

During the past year a first-hand study of the date varieties of the Mesopotamian region has been made by specialists of the Bureau of Plant Industry, with special reference to locating, if possible, varieties suited to some of our southwestern valleys where the occasional occurrence of untimely rains during the ripening season renders the north African varieties unsuited to commercial culture. Offshoots of a number of interesting and promising varieties were secured, which will be tested under conditions existing in this country, particularly in the lower Rio Grande Valley in Texas, where there is much interest in the possibility of establishing the commercial production of this crop.

Boron Injury to Plants

In view of the recent discovery that certain plants, such as oranges, lemons, and walnuts, are especially sensitive to small quantities of salts of boron in the soil moisture, material progress has been made in the investigation of this problem. It has been found that with the more sensitive plants boron injury may occur from the use of irrigation water containing boron in excess of 5 parts in 10,000,000. From the surveys conducted during the past year it has been found that certain irrigation waters in California and Nevada carry injurious quantities of boron, but it has also been found that in general the boron occurring in surface water supplies may be traced to one or more comparatively limited sources, so that by diverting these wells or streams from the main water supplies it appears possible to reduce the boron concentration below dangerous limits. Since some crop plants are much more tolerant of borax than others, it appears probable that the waters with relatively high boron content may be utilized for irrigation of those crops that are usually benefited or at least not injured by boron content above the safe limit for citrus fruits or for walnuts. The California Agricultural Experiment Station is cooperating with the Bureau of Plant Industry in these investigations.

Scab Disease of Wheat and Barley

The scab disease of wheat and barley, which occurs more or less commonly each year in the more humid areas of America and Europe, caused heavy losses of spring wheat and barley in some of the Corn Belt States in 1928, particularly in parts of Ohio, Illinois, Indiana, and Iowa. When fed to hogs, scabbed barley produces digestive troubles. The fact attracted wider attention than usual, owing to the exceptional extent of the scab outbreak. Extensive feeding experiments were conducted in the department with scabbed barley. Barley containing more than 10 per cent of scabbed kernels is unpalatable to hogs, and many hogs will not eat it. It was found, however, that such grain may be fed to cattle and sheep with safety. Chemical studies of a preliminary nature indicated that in scabbed barley three general types of change took place: (1) starch and dextrin hydrolysis to dextrins and glucose, respectively; (2) fat hydrolysis with marked increase in fatty acids; and (3) protein hydrolysis with increase in basic and water-soluble nitrogen. It has not yet been definitely determined which class of substances causes the trouble with swine, but the water-soluble nitrogen fractions are believed to be the cause. The area affected by the scab disease in 1928 usually produces only a small part of the barley and spring wheat grown in this country. It produced more than usual last year because barley and spring wheat were largely used to replace winter wheat that had been winterkilled.

Cause of Scab

Scab is caused by a parasitic fungus (*Gibberella saubinetii*). It attacks rye, barley, oats, corn, and some wild grasses as well as wheat. One stage of the fungus occurs on old cornstalks, from

which it may be transmitted to wheat or other small grains, when those crops are sown following corn, if the old cornstalks have not been plowed under. Removal or burial of old cornstalks reduces the infection to such an extent that the scab does not cause serious losses to the crops that follow the corn. Scab-resistant varieties are being developed by the department in cooperation with State experiment stations. Such varieties of barley as Norka, Progress, Resaca, Illinois No. 1, Oderbrucker, and Manchuria are fairly resistant. Treating well-cleaned seed with one of the standard mercury-dust disinfectants is a helpful control measure.

Control of Bacterial Spot

Gratifying progress has been made in the practical control of bacterial spot, a disease which attacks the twigs, leaves, and fruit of the peach, causing heavy losses in Illinois, Indiana, North Carolina, South Carolina, Arkansas, Tennessee, Kentucky, and the Maryland-Delaware-Virginia Peninsula. Trees in a high state of vigor tend to be resistant, and therefore fertilization, pruning, etc., are of great value in preventing losses from the disease. Work upon the problem of developing a spray which could be applied repeatedly to the peach without injury, which would be cheap, and yet control the disease, was begun in 1925. Of about 200 different sprays tested during this period, one composed of 4 pounds of zinc sulphate combined with 4 pounds of hydrated lime, in 50 gallons of water, has given definitely favorable results. Supplementary to proper fertilization, pruning, and other good orchard practices, six applications of the zinc-lime spray at intervals of two weeks beginning at petal fall have, in experimental tests, given satisfactory control. In these tests it has greatly checked the disease on leaves and fruits, has not injured any part of the trees even when used at double strength, has stimulated leaf development, and can safely be used with the insecticide, arsenate of lead. The ingredients are cheap and easily obtained.

Phony Disease of Peach Trees

After several years of intensive investigation of the mysterious phony disease of peach in Georgia with negative results, late in 1928 the communicability of the disease from the roots was established. After all the usual known methods of artificial transmission of virus diseases affecting trees had been tested and had failed, the grafting of diseased roots on healthy peach roots gave positive results. The communicability of the disease being thus established, a quarantine to prevent its spread on the roots of nursery stock from the infected region to other sections was established, and an extensive cooperative program of control of the disease by promptly eradicating all trees found infected has been started. Much research work upon the disease still remains to be done to determine the natural infection method, and in the direction of finding or developing disease-resistant stocks suitable for the peach. However, the progress already made is sufficient to encourage the expectation that this disease, which recently assumed such proportions as to threaten the

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extensive peach industry of our South Atlantic States, will eventually be brought under control.

LIVESTOCK-DISEASE CONTROL

Livestock production is gradually being protected from the hazards and losses caused by disease, and made more profitable through knowledge gained by experimental work on breeding, feeding, and management. The suppression of animal diseases and parasites is accompanied by the strengthening of barriers to exclude plagues and pests that cause heavy losses in other countries. Our extensive foreign commerce involves constant danger of the occasional appearance of foreign diseases, especially at or near seacoast ports. But the department takes every reasonable precaution and is prepared to deal promptly with any outbreaks that may occur.

An outbreak of foot-and-mouth disease in January, 1929, was quickly eradicated. The country had been free from this malady for several years. It principally affects cattle, sheep, swine, and goats, and its great danger lies in the degree to which it reduces meat and milk production, and in the extreme rapidity with which it spreads. The infection entered through garbage from a merchant vessel that had taken on a quantity of fresh meat in South America. The ship docked at San Pedro, Calif., the harbor of Los Angeles. Hogs on a Los Angeles County ranch developed the disease after being fed garbage from the vessel. Several hundred swine on the same ranch became infected within a few days.

Prompt and vigorous action was necessary. Accordingly, the United States Department of Agriculture, cooperating with State and county officials, established a protective quarantine about the hog ranch, and slaughtered and buried the entire herd, numbering 3,271 animals. Some cattle on near-by premises were slaughtered and buried also. Inspectors then undertook to trace any infection that might have spread while the disease was in the incubative stage. In a few weeks the disease developed on four other premises within a few miles of one another. All the animals on these premises were promptly slaughtered and buried even when only a few showed symptoms of the disease. By this drastic action the outbreak was restricted to the five premises mentioned. As on previous similar occasions, owners of the condemned livestock were reimbursed, at a fair appraisal, for livestock and property destroyed.

This visitation of foot-and-mouth disease caused less loss to the livestock industry and less interruption to business than any previous outbreak. It lasted only two months, setting a record in quick eradication. A noteworthy detail of the eradication proceedings was the prompt inclosure of infected or seriously exposed premises with a high fence of chicken-wire netting. This barrier restrained dogs, poultry, and other small animals, as well as unauthorized persons, from entering. It aided the guards at gateways in maintaining a rigid quarantine. The success of the eradication shows the importance of maintaining a well-trained force of veterinarians for such emergencies. Occasional outbreaks need not cause undue alarm, but should be the signal for energetic, cooperative action. Regulations for excluding foreign maladies are our first line of defense, but can not be relied on exclusively.

The infectious poultry malady, European fowl pest, which appeared in the United States in 1924 and was eradicated in 1925, made a second appearance in June, 1929. The outbreak involved eight premises in Morris County, N. J. It was so promptly diagnosed and suppressed that the losses were without economic significance. Eradication was effected essentially through the destruction of affected fowls, and the cleaning and disinfecting of premises. No other foreign livestock diseases gained admittance to the United States during the last fiscal year.

Eradication of Bovine Tuberculosis

Progress is being made in combating bovine tuberculosis, tick fever, hog cholera, sheep and cattle scabies, and various other domestic maladies. In the campaign against bovine tuberculosis more cattle were tested in 1928–29 than in any previous fiscal year. Nearly a million cattle a month were tested, the total in round figures being 11,665,000. The degree of infection found was 1.8 per cent, as compared with 3.9 per cent about eight years ago. These results and other data indicate that tuberculosis among cattle has been reduced more than 50 per cent since systematic eradication began.

Two States, North Carolina and Maine, were designated during the year as modified accredited areas; that is, areas in which tuberculosis infection among cattle has been reduced to less than one-half of 1 per cent. This was a significant demonstration that bovine tuberculosis can be eradicated from large areas. The work began with individual herds and was extended first to a county-wide and eventually to a state-wide basis of testing. Other States are rapidly approaching the goal attained by North Carolina and Maine.

Some 740 counties in the United States have attained the designation of modified accredited areas. The work is progressing in about 460 other counties. Thus area work has been completed or is under way in 1,200 counties, or considerably more than one-third of the counties in the United States.

State Action in Eradication Work

In nearly all States the legislatures were in session during the fiscal year 1929 and, with few exceptions, provided legal authority and appropriations to facilitate bovine-tuberculosis eradication. Some States modified their laws to make possible the extension of county-wide testing, so that all counties might have the opportunity to become modified accredited areas within the next few years. Moreover, State legislatures showed a tendency to increase the amount of compensation paid as indemnity to owners of cattle condemned as tuberculous. Federal indemnity was increased to permit a maximum payment of $70 for purebred cattle instead of $50 as before, and a maximum of $35 for grade cattle instead of $25.

Prevention of the spread of bovine tuberculosis by the summary destruction of diseased animals was held to be constitutional by the Supreme Court of Ohio in its recent decision in Kroplin *v.* Truax, 165 N. E. 498. Compensation to the owner is not a prerequisite to

the exercise of such authority, since the destruction of the animals is merely the abatement of a nuisance. If compensation is given, it is a mere gratuity. The decision in this case is in accord with prior decisions of the courts of other States. The principle of law involved now seems to be well settled.

It is necessary for a county recognized as a modified accredited area to qualify for reaccreditation after a period of three years. Under this provision 104 counties whose modified accredited status recently expired made further tests of their cattle. The results again showed that the degree of infection did not exceed one-half of 1 per cent, and indicated that areas in which tuberculosis has been reduced to a negligible quantity can be kept so by proper precautions. Ample funds for tuberculin-testing work during the coming year promise further progress.

Infectious Abortion

With the gradual suppression of tuberculosis, infectious abortion appears as the greatest plague now affecting our cattle industry. This disease takes an annual toll, from both beef and dairy herds, estimated at fully $50,000,000. The disease also affects hogs. Hence the total damage is considerably more than the figure mentioned. No large part of the country escapes its ravages entirely, though the older dairy sections suffer most.

Stock breeders and dairymen manifest growing interest in the control of this baffling malady. Control methods based on present knowledge, though successful in many cases, have not proved practicable in all, owing to the labor, equipment, and expense involved. There is urgent need for a simple and effective means for combating the disease. Especially desirable is an effective and inexpensive system of artificial immunization. Encouraging experiments have been made, and further studies are in progress. Recent observations indicate that the eye may be an important channel of infection.

Increased appropriations for the study of infectious abortion were made available by Congress for the year ending June 30, 1930. The department will continue its independent investigations, and undertake in addition an expanded research program in cooperation with several State experiment stations. Both technical experiments and field trials will be made.

PACKERS AND STOCKYARDS ACT

As is the case with most new regulatory acts of broad scope, the Secretary's authority has been challenged in connection with the enforcement of the packers and stockyards act. This measure, passed in 1921, vests in him certain authority over packers, stockyards, and market agencies and dealers operating in public livestock markets. It is the policy of the department to obtain a ruling by the courts in all cases in which its orders under the act are questioned. One case was decided by the United States Supreme Court during the year; another is now pending in that court.

The case decided was that of the United States *v.* American Livestock Commission Co. et al.—the so-called Oklahoma boycott case. The decision, handed down May 20, 1929, sustained an order of the

Secretary against certain market agencies and livestock dealers operating at the Oklahoma National Stockyards. In this order, issued March 31, 1926, the Secretary directed the agencies and dealers concerned to cease using unfair or discriminatory practices in the purchase and sale of livestock. Specifically, the order prohibited the respondents from agreeing among themselves to refrain from dealing with the association. The market agencies and dealers urged that there was nothing to prevent their dealing or refusing to deal with whom they chose. With respect to this claim the Supreme Court said: "But we think it does not need argument to show that a boycott of a dealer in a stockyard may be an unfair practice under the act as it is found to have been in this case."

In the pending case—Tagg Bros. and Moorhead et al. *v.* The Secretary of Agriculture, commonly known as the Omaha rate case—the Secretary prescribed rates which in his judgment would be reasonable for the handling of livestock on a commission basis by certain market agencies on the Omaha market. The district court of three judges for the district of Nebraska upheld the right of the Secretary of Agriculture to prescribe reasonable rates for this service, and sustained the reasonableness of the schedule of rates which he had prescribed.

Its decision said:

> For many years the agencies have operated under a schedule of rates fixed by their Omaha Exchange and undoubtedly the fact that rates are so fixed by an organization of which the commission men and traders are members and their customers, the livestock owners and shippers, are not, inclines public authority, to take a hand in the matter. * * * If the owners of the 58 firms or corporations comprising the respondents can, through a committee or whatever other machinery they see fit to adopt, arrive at rates to be charged the shippers, a disinterested governmental agency can fairly arrive at such rates. * * * There does seem to be an incongruity between the fact that commission men operate under uniform, fixed rates and yet make the claim that the sovereign power can not require that the rates be reasonable.

The respondents appealed, and a date has been set for argument before the United States Supreme Court.

ANIMAL-HUSBANDRY STUDIES

Animal-husbandry investigations carried on in the department now deal more largely than formerly with the business side of livestock production. Research projects no longer seek merely to determine which of two systems of producing farm animals is the better. They must tell the farmer and the stockman approximately how well each of the systems will pay. It has long been generally known, for example, that grass is the stockman's cheapest feed. Low feed costs are important. Experiments conducted under farm conditions have shown, however, that a ration costing the least per unit of gain on cattle, hogs, or sheep may not be the most profitable. Much depends on the quality of the finished product, on changing conditions in market demand, and on other factors. Results of a research project carried out in cooperation with the West Virginia Agricultural Experiment Station illustrate the point. Grass-fed steers that received a supplement of corn and cottonseed meal gained 39 per cent more and were 22 per cent more profitable than steers of the same age, weight, and quality fattened on grass alone.

The cattle that received supplemental feed had a slightly higher dressing percentage than those receiving grass only. As feeder cattle, as slaughter cattle, and as dressed carcasses, the cattle which received grain and a protein supplement graded consistently higher than the cattle fattened on grass alone. Studies of the meat produced in this experiment gave significant results. A mechanical test of the breaking strength of roasted rib muscle, and a report on the tenderness of the meat by judges of palatability, indicated that the animals given a supplementary ration produced the better meat. Besides demonstrating that the cheapest feed may not be the best, the tests showed what the better method is.

Investigations conducted in cooperation with the Purdue Agricultural Experiment Station yielded data pointing to a similar conclusion in the case of sheep. During the summer of 1928 the net return per lamb, above the cost of feed for both ewes and lambs, was $6.66 more for a flock of sheep kept on pasture than for a flock fed grain and alfalfa hay in dry lot. However, a third flock was managed by keeping the ewes and the lambs on pasture and feeding the lambs grain in a creep. These lambs netted $1.11 more per lamb than the lambs that had pasture only. These and other results from the experiments show not only the value of pasture and its profitableness as a feed for lambs, but also that a grain supplement may increase the net returns, if the grain is not too high in price.

Growth of Wool and Mohair

Another interesting investigation dealt with the growth of wool and mohair. It showed that these fibers grow at varying rates during different seasons, the growth being least in the winter and greatest during the summer and fall. As the wool fibers grow longer they increase in diameter, a fact of importance both in production and in manufacturing. Studies are in progress to ascertain the influence of nutrition and management on the growth of wool and mohair.

Diet deficiencies in pigs and the relation of such deficiencies to the development of the teeth and the skeleton are being investigated. This work is conducted in cooperation with Johns Hopkins University and the American Dental Association. It has revealed that profound changes occur in the teeth and in general development when lime or phosphorus is lacking in diets otherwise adequate. This study gives promise of supplying more definite knowledge about animal nutrition, and also valuable information relating to human beings. Rachitis or "rickets" is a common disease of children evidenced particularly by weakness of the bones. Rachitis in swine is similar and probably identical. The feeding of swine rations deficient in lime salts, though otherwise complete, resulted in marked symptoms of this disease. Feeding rations deficient in phosphorus produces similar effects, though to a less degree.

Poultry Problems

Poultry problems are receiving increased attention. Particularly valuable results have come from experiments made to delay the molting time of laying hens by feeding them sulphur compounds. Sulphur is an important constituent of hens' feathers. It was believed

that giving proper quantities of a suitable sulphur compound might either delay the molt or cause it to have less effect on egg production at the season when eggs are high in price. It was discovered that a mixture of certain inorganic sulphur compounds increases the annual egg production of both pullets and laying hens. White leghorns given the sulphur mixture produced from 12 to 21 per cent more eggs in a year than other white leghorns not given the mixture.

Means of reducing losses caused by poultry maladies are under investigation. It has been demonstrated that pullorum disease, widely known among poultry owners as bacillary white diarrhea, may spread from chick to chick in the same incubator.

Studies of poultry parasites have furnished new knowledge concerning tapeworms and certain roundworms. Several species of snails, beetles, and grasshoppers have been found to serve as intermediate hosts for various internal poultry parasites. This knowledge emphasizes the importance of the prompt disposal or droppings. In short, the poultry industry is receiving the benefit of technical studies comparable to those heretofore made regarding the larger animals.

DAIRY RESEARCH

Recent investigations in the Bureau of Dairy Industry have developed new methods of controlling bacterial fermentations in the ripening of cheese. The use of these methods makes possible a great improvement in quality of cheese. Although about 20,000,000 pounds of Swiss cheese are made annually in the United States, it is necessary to import more than 15,000.000 pounds. The imported cheese is of the better grades and commands a higher price than the domestic product, much of which is defective in eye formation and flavor. Even factories that use the pure cultures of bacteria developed by this department turn out from 5 to 15 per cent of cheese that is defective because of abnormal gassy fermentations, or has a woody rather than a rubbery texture. The defective texture is associated with the use of bacterial cultures which induce a rapid formation of acid in the warm curd while the cheese is on the press. In order to suppress abnormal gas formation it is necessary to have an acid-forming culture which will check the growth of the undesirable bacteria. A new culture which is free from these two difficulties has been found. It survives the high temperatures of the cheese kettle and is actively growing when curd is put on the press. It begins acid formation before the gas formers are able to multiply. In a large number of laboratory and factory experiments this culture has invariably suppressed abnormal fermentations without impairing the texture of the cheese.

Under present conditions skim milk is a waste product in the manufacture of butter, and much of it also goes to waste in the production of market milk during seasons of surplus. One means of lessening this waste is the use of a process developed by the department for concentrating sour skim milk. Concentrated sour skim milk will keep without deterioration for several months and does not require special care. It is sold mainly as a poultry and hog feed, and many creameries and milk plants have found it profitable to make

the product by the department's process. In the last year the department has assisted a number of plants in establishing the process and has furnished many more with cultures and detailed directions. In making concentrated sour skim milk 27 plants utilized 76,000,000 pounds of skim milk in 1928, an average of nearly 3,000,000 pounds per plant. It is made also in some plants for which records are not available. Probably 100,000,000 pounds of skim milk were used in 1928 in making concentrated sour skim milk.

Cities Aided in Improving Milk Supply

During the year the Buréau of Dairy Industry aided many cities in improving their milk supplies. It advised them regarding legislation, the unifying of inspection systems, and the proper training of dairy inspectors. City and State milk ordinances were studied and tabulated, and information about dairy inspection was sent monthly to all dairy inspectors in towns and cities. Simple and efficient methods for producing and handling milk have been worked out by the bureau. A general policy of education among dairy farmers is necessary to get these methods widely adopted. Accordingly, the bureau has made comprehensive plans for community and state-wide educational programs to be carried on through the extension agencies of the State agricultural colleges.

Dairy herd improvement associations, in which the department is keenly interested, increased in numbers from 947 to 1,090 during 1928. This was a gain of 143 associations, or approximately 15 per cent. More than 465,000 dairy cows are on test in these associations for the economical production of milk and butterfat. Their average production in 1928 was 7,464 pounds of milk and 295 pounds of butterfat, or more than 60 per cent above the average production of all the dairy cows in the country. The records proved once more that high-producing cows return a high average income over the cost of their feed. Cows producing 500 pounds of butterfat per year ate more than twice as much feed per cow as did those producing 100 pounds, but returned more than fourteen times as much net income.

HOME ECONOMICS

The department through its Bureau of Home Economics during the last year continued and broadened its studies of practical, everyday home problems important to health and satisfactory living. Nutrition principles were expressed in daily menus, and recipes for the preparation of foods were tested. The food habits of children were studied and a bulletin prepared giving nutrition facts, menus, and recipes. In this work the department cooperated with the Washington Child Research Center, with mothers, and with children's institutions. Designs for children's clothing were published in department leaflets and popular articles. Cooperative relationships were maintained with manufacturers of patterns and ready-to-wear garments, so that mothers might purchase patterns or garments based on the designs.

The quality of family living depends almost as much on how the income is spent as on the amount of the income. Accordingly,

studies were made to help the housewife in planning and recording family expenditures. A bulletin was prepared describing various methods, and a supplementary, loose-leaf account book was issued to simplify the keeping of household records. A bulletin in preparation discusses family expenditures and gives typical budgets at different income levels. Two preliminary reports were made on how time is spent in the home. These were based on the records of 1,000 rural home makers. They will be followed by popular publications on the preparation of time schedules and the planning of household tasks. Some information on the equipment used in the home laundry and in the preparation of food was assembled, but much more is needed as a basis for advice on the wise choice of such equipment. Studies on home refrigeration compared the cost of operation and management of ice and mechanical refrigerators. Bacteriological studies showed the most desirable temperatures for the household refrigerator.

The relative utility and economy of agricultural products used in the home was studied. This work included palatability tests to determine the influence of methods of production and other factors on the palatability of foods. Tests of the palatability of meat were made to help producers determine how the most palatable meat can be produced most economically. Facts were thus established which should enable them eventually to produce the kind of meat that is most acceptable to consumers.

Rice Varieties Tested

In the handling of rice geographical preferences affect marketing. The department sought to determine whether methods of cooking might be so adapted to different varieties as to make them yield a finished product of comparable texture. Eight common varieties of rice were cooked under varying conditions. It was demonstrated that different varieties of rice cook differently, some more completely and in less time than others. This indicated the desirability of avoiding a mixture of varieties in grading.

Considerable information on the composition and the mineral and vitamin content of food products, and the relation of these factors to good nutrition was obtained. Studies of food composition were supplemented by special chemical analyses.

A special study was made of two agricultural by-products, rice polish and wheat germ, which are valuable sources of certain food nutrients. It was shown that these discarded germ portions are very high in vitamin B, especially in the antineuritic factor, so important in the diet of children. These parts of the grain are generally discarded or used as feed for livestock, largely because they tend to become rancid. By slightly heating germ portions and placing them in sealed containers, however, this rancidity can be prevented. Accordingly, recipes were worked out showing how the by-products in question may be used as food. This is particularly desirable where diet is likely to be restricted in either minerals or vitamin B. This process also affords a method of utilizing a valuable part of the grain without interfering with the usual method of milling white flour or polishing rice.

Utilizing Different Grades of Products

Efforts to develop uses for all the grades of different crops, so that the entire output may find a profitable market, produced significant results. The department suggested a number of uses for osnaburg, a fabric made from low-grade cotton, and the sale of this material was stimulated so that its increased manufacture absorbed more low-grade cotton. A study to determine the influence of the quality of cotton on the durability of fabrics was begun. This and similar studies should assist manufacturers to select the grade of cotton best suited to their requirements.

Study of food-handling costs resulted in recommendations for improvement. Education in the choice of foods, an important phase of home economics, necessitates keeping in touch with the home on the one hand and the food supply on the other. It is important to consider the food supply not only as a source of economic return to the producer but also as a source of adequate human nutrition. Also it must be regarded from the standpoint of the supply as a whole, rather than from the standpoint of a single group of commodities. The need for education in the choice of foods has been increased by unethical advertising used to promote the sale of special foods.

Food Expenditures Analyzed

In studies of the farmers' standard of living, recorded food expenditures were analyzed and material prepared for publication. A beginning was made in the study of food used by business and professional groups. Information is required also regarding the food habits of families in the wage-earning and clerical groups. Information about consumer demand under changing economic conditions should make it possible to estimate market requirements more closely, and thus to improve supply and demand relationships.

FUNDAMENTAL RESEARCH IN THE DEPARTMENT

As this is an anuual report rather than a history of the department, it must be largely confined to the work of the last 12 months. But this rule can not be uniformly applied. It must be set aside entirely in reviewing research, for scientific inquiry can not be evaluated annually. It is essentially a long-time activity, which can be truly appraised only on a long-time basis. Much research started in the department and in the State experiment stations long ago is only now beginning to bear fruit. Years may pass before certain current studies yield practical results. Only by noting the outcome of research work over a long period can we form a just idea of its value. I shall therefore not restrict myself to the developments of a single year in dealing with the subject of research, but shall glance over the record of several decades.

Though some familiar facts may appear in the retrospect, the story as a whole will emphasize the latest application of the department's scientific discoveries. This phase of the matter changes constantly and increases steadily in economic importance. Scientists are accustomed to distinguish between fundamental research and studies having simply an immediate practical object. This distinction is

valid enough, but it sometimes inclines the layman to think that fundamental research is not practical. In reality it is practical in the highest and most permanent sense. It may therefore be worth while to chronicle some of the practical results of fundamental research done in the department. Time and again facts or principles thought at first to have only a scientific interest have turned out to be of revolutionary importance.

Fundamental research done in the Bureau of Animal Industry from 1888 to 1893 demonstrated that a microorganism found in the blood of cattle affected with Texas fever is the actual cause of the disease and that the cattle tick is the means whereby the disease is transmitted. This was the first demonstration that a microbial disease could be transmitted exclusively through the agency of an intermediate host or carrier. The discovery ranks among the great achievements of medical science, for it led to the knowledge that such diseases as yellow fever, malaria, typhus fever, African sleeping sickness, Rocky Mountain fever, magana, and others are carried through an intermediate host. The control of yellow fever in the Panama Canal Zone was thus made possible.

Achievements in Livestock-Disease Control

Studies begun in the same bureau in December, 1885, showed that immunity to a disease could be produced by the injection of killed cultures of bacteria. This result of fundamental research was later applied in vaccination against typhoid fever and other bacterial diseases. A technic was developed for the diagnosis of dourine in horses by means of a complement fixation reaction. This brought into use a reliable method for detecting animals affected with this and certain other insidious diseases. The test has had extensive application in this country, with gratifying results in the control and eradication of dourine of horses. It has served in detecting animals offered for import that harbored diseases not existing in this country. Later studies showed that botulinus toxin produced symptoms in horses identical with those of forage poisoning. This discovery opened a new field in the study of cerebrospinal meningitis, or forage poisoning in horses, and furnished new methods of prevention and treatment. The department recently proved that anaplasmosis, a disease of cattle, exists in this country, and the knowledge led to experimental methods of control and treatment. Previously stock owners had spent much money in treating animals sick of anaplasmosis with methods used for other diseases for which anaplasmosis had been mistaken. Though the problem is not settled, the new control measures seem to be keeping it in check to a certain extent. Further research may reveal the various carriers of the disease.

Other studies developed an effective immunizing agent—hemorrhagic septicemia agressin—against hemorrhagic septicemia or shipping fever of cattle. This product, now prepared commercially, has been an extremely reliable means of reducing losses from the disease. Approximately 3,900,000 doses were prepared in 1927, and over 3,700,000 doses in 1928. The product was manufactured to a greater extent than any other biological agent except blackleg

agressin. Its proved potency and extended use undoubtedly saved livestock owners large sums.

A research result roughly measurable in dollars and cents is the department's discovery that sodium hydroxide is a much more effective disinfectant against foot-and-mouth disease than compound cresol and bichloride of mercury, substances heretofore largely used. An enormous quantity of disinfectants is used in combating outbreaks of foot-and-mouth disease. In the California outbreak of 1924, 702 premises and more than 21,000 railroad cars were disinfected. Sodium-hydroxide, besides being a better disinfectant, costs only about one-fifth as much as compound cresol solution, and about one-third as much as bichloride of mercury.

Significance of Hookworm Discovery

Exceptionally important was the department's discovery of a new species of hookworm that is widely prevalent in the Southern States. This discovery opened a public-health problem that eventually led to the establishment of the International Health Board of the Rockefeller Foundation. Subsequently the department introduced carbon tetrachloride as a remedy for hookworm disease, and it has been used in treating more than 15,000,000 cases throughout the world. More recently tetrachlorethylene was recommended as being effective and safer than carbon tetrachloride. This is now receiving extensive tests.

Research in the department interpreted the phenomena of the large intestinal roundworm of human beings and swine. The new knowledge became the basis of a system of raising swine designed to protect these animals from roundworm infestation. This system, begun on a small scale in McLean County, Ill., in 1919, was gradually extended, with surprisingly good results. Observations on many different farms in the Middle West, involving studies of the litters of several thousand sows, showed that as many pigs can be raised from two sows under this system as are ordinarily raised from three sows under the conditions obtaining on most farms. The sanitation system produces thrifty pigs, of uniform size, practically without runts, whereas the ordinary system of raising swine produces many undersized pigs. This swine-sanitation system saves the farmers in the Corn Belt probably $1,000,000 a year. It is being tested in the South, and has been adopted on many farms there.

Some diseases, among them bovine tuberculosis and infectious abortion, require prolonged study before their fundamental facts can be discovered. Certain basic facts regarding these two diseases have nevertheless been established by the department. It has been determined that many tuberculous cattle, even when outwardly in good health and condition, eliminate living tubercle bacilli in their feces through having swallowed infected material coughed up from their lungs. This showed how hogs become infected, and indicated necessary precautions. As this discovery revealed an important channel through which the casual agent of the disease is disseminated, its economic value is undoubtedly great.

Investigations of the cause of hog cholera were begun in the department as early as 1878. They were continued almost unin-

terruptedly, but without tangible practical results until 1903, when the fundamental discovery was made that hog cholera is caused by a filterable virus. Since then progress in the control of the disease has been rapid. A preventive serum has been developed which enables farmers to engage in hog raising with security against loss from hog cholera. Further research is required to determine the nature of the hog-cholera virus. It can not be cultivated outside the hog, and it can not be seen by the highest powers of the microscope. It passes through filters. If its nature were known, science could probably combat it more effectively.

Discoveries Regarding Mosaic Diseases

Knowledge of the so-called mosaic diseases of tobacco, tomato, cucumbers, potatoes, sugar beets, corn, wheat, sugarcane, and many other cultivated crops, including fruits, is the result largely of research on the part of department and experiment station workers. The mosaic diseases are caused by filterable viruses introduced by plant lice and leaf hoppers. Threatened industries have been reestablished by the breeding of resistant varieties of the affected plants. In this way the potato industry has been protected and the sugar industry of Porto Rico and Louisiana reestablished. It was first demonstrated by this department that resistance to disease in plants is a genetic character, and that resistant qualities can be bred into or out of plants. Wilt-resistant cottons and melons were the practical outcome. These varieties made it possible to grow cotton and melons in infected soils, and saved the money crops of large regions. The principle has been applied to many other crops and diseases.

Another discovery in the department made it possible to secure crosses of species whose blooming periods are so far apart that pollen can not be preserved long enough to secure crosses. This revealed that the flowering and the vegetative growth of plants are controlled by alternations of light and darkness, and that the time of flowering can be controlled by changing the length of the periods of exposure. Thus plants with flowering periods far apart can be brought into flower simultaneously. This is of value in hybridization and in other connections.

In 1916 the department became interested in the production of citric acid by the action of certain molds working on sugar solution. A laboratory process was developed which eventually made the United States independent of foreign domination in this important product. Italy in 1928 placed a tax on the export of citrate of lime to encourage home production of citric acid. In the same year the citrus crop in the Pacific States was so good that few culls were available for the domestic production of natural citric acid. An American manufacturer, using the process discovered in the department, met the domestic demand for citric acid, without an appreciable increase in the domestic price. Meantime England and other foreign countries had to pay export taxes to meet their demands for citric acid. Citric acid sold in England for as much as 65 cents a pound, while the price here remained at 46 cents. The estimated saving to this country was $700,000. About $3,000,000 worth of citric acid is produced annually by this method.

Calcium gluconate is coming to the fore in the medical administration of calcium. It has advantages not possessed by other salts of calcium, in that it can be injected into the skin or the muscles without causing necrosis of the tissues. Moreover it is the only tasteless salt of calcium. Calcium gluconate also shows promise for the administration of calcium to poultry and cattle. If this use develops, an enormous demand will arise for the product. A new chemical process for the production of gluconic acid and calcium gluconate has been developed in Switzerland, but this process is fully protected by patents in this country and constitutes a monopoly. However, a process has recently been developed in the department for the production of gluconic acid from glucose by means of molds. This acid, formerly a chemical curiosity valued at 30 cents per gram, can now be produced by our methods for little more than that per pound.

Results from Soil-Fertility Studies

Study of the nutritional requirements of the sugar beet led to the general use of superphosphate and other commercial plant foods on the sugar-beet lands of the West. The result is a large increase in yields per acre, and also a significant increase in the sugar content of the beets. Application of this research achievement brought increased prosperity to the growers and larger profits to the sugar-beet factories.

Until about 20 years ago it was believed that there was not much difference between the various proteins with respect to their nutritive value. To-day we know that of the 18 or 19 compounds called amino acids, of which proteins are composed, some are absolutely essential for growth and nutrition. Many proteins in some of our most important foods and feedstuffs have been found to be lacking or deficient in one or more essential amino acids. Conspicuous among these are the chief proteins in corn, wheat, several other cereals, and in some beans and in lentils. This new knowledge, which has revolutionized our ideas regarding the nutritive value of foods, was gained through fundamental research started in the Connecticut Agricultural Experiment Station, and supplemented by studies conducted in this department. The composition of many proteins in different foods and feedstuffs has been determined, and the percentages of the different amino acids estimated. More than 100 publications give the results, which are widely used by workers in dietetics and in animal husbandry. It is now possible to mix feedstuffs so that the amino-acid deficiency of one protein will be supplemented by adding to the ration another feedstuff which is rich in that acid. The practical value is extensive.

A new method for the production of phthalic anhydride, the most important raw material used in the production of many dye substances, was developed in the department in 1918. The process involved the catalysis of naphthalene into phthalic anhydride when naphthalene was converted into a gas and mixed with air. A public-service patent was obtained, and the process made the United States independent of foreign supplies of phthalic anhydride. More than 6,000,000 pounds of phthalic anhydride were produced

commercially in 1928 at a reduction in price representing an estimated saving of $1,000,000 a year to the American public.

Utilization of Citrus By-Products

Research in the utilization of citrus by-products was undertaken to develop methods applicable particularly to conditions in California. Methods of obtaining lemon oil, orange oil, citrate of lime, and citric acid under American conditions, with machinery and mass production superceding the laborious hand methods employed in European citrus districts, were developed and demonstrated. The Citrus Growers Exchange of California applied the results in two large by-product plants. In a recent year one of these plants utilized more than 40,000 tons of cull lemons, and produced 2,000,000 pounds of citric acid, 65,000 pounds of lemon oil, and 30,000 pounds of pectin. In value these products exceeded $750,000. Another company used 10,000 tons of surplus oranges in one year recently, and produced 50,000 pounds of orange oil, valued at more than $100,000. This was done from materials which, prior to the department's discoveries, were waste products.

Results of epochal significance have been achieved in the study of nitrogen fixation. Though too technical for extended description here, some of the outstanding points in this field may be mentioned. Manufacturers of synthetic ammonia, for example, use a catalyst developed in the department. Study of high-pressure gas reactions has produced important data used by designers of machinery and by industrial chemists. Particularly valuable have been the results of investigations in the department regarding the ammonia-vapor content of nitrogen-hydrogen mixtures in contact with liquid ammonia under pressure. Data developed are used by synthetic-ammonia manufacturers in designing condensers for removing ammonia from the nitrogen-hydrogen gas mixtures.

Experiments made in the production of phosphoric acid by electric-furnace smelting of phosphate rock have had important industrial results. Other experiments in blast-furnace smelting of phosphate rock have likewise been applied industrially. Potash extraction by a sulphuric-acid method developed in the department is used commercially, as is also glaucosil, a by-product of potash extraction from greensand. The department helped to overcome the potash shortage resulting from the war by developing a method of potash extraction from silicate rock by calcination with lime or digestion with free lime under pressure. Analytical methods developed for using fluorine, borax, and phosphoric acid in fertilizers have been adopted by the Association of Official Agricultural Chemists and are in general use throughout the country. Apparatus developed in the course of this work is commercially manufactured and distributed.

Importance of Fundamental Studies

These are only a few of the benefits the Nation derives from fundamental research done in the department. A full recital would fill volumes. It is well to emphasize the material benefits that come from well-directed research, because the work requires material support. Nevertheless, a narrow view of the purposes of science

tends to defeat its object. Scientific investigations are sometimes most fruitful when directed merely toward the discovery of fundamental principles. Hence the ultimate justification in utility may be remote rather than immediate. Results will come, which can not be reckoned in advance. Results achieved as an unexpected by-product are often more important than those originally contemplated.

Heretofore the department has met a serious difficulty in its research work. Its technical men have not been authorized to shape or change the course of their investigations in accordance with changing requirements. They have been called on to justify proposed expenditures in terms of expected concrete advantages. This is always difficult and often impossible. Research, since it seeks to penetrate the unknown, is fundamentally inconsistent with any general attempt to foresee its results. Facts learned in the course of an investigation may alter its direction and open up new possibilities. Information gained in one study may profoundly influence the development of another. When research policies make no allowance for this fact, their potential utility is reduced. Fundamental research tends to be most productive and ultimately useful when it may be modified or expanded as its accumulating results may dictate.

Lump Sum for Research Desirable

It would be extremely helpful in the department's work if a lump sum, available until expended, were appropriated for basic investigations. This would permit lines of inquiry to be pursued uninterruptedly even if a radical change of their direction became advisable. Under the present system, whereby research funds are appropriated item by item, more than a year must elapse after plans are made before the funds become available. If circumstances necessitate a change of plan, another delay occurs. Many research projects progress well enough under this system. Cases often arise, however, in which the lack of elasticity in the shaping of research programs involves costly delay or even an indefinite frustration of the objects in view. Our research heretofore has been largely developed to meet emergencies and to throw up a hurried defense against diseases and pests. It has yielded important results, as the facts I have given sufficiently attest. Unquestionably, however, this method of working should be supplemented by a continuous program of inquiry into basic principles. Such a policy would accumulate forehanded knowledge which would facilitate the solution of specific problems as they arose.

STATE EXPERIMENT STATIONS

In the State agricultural experiment stations the department has strong and resourceful allies. These State institutions obtain about one-fourth of their support from the Federal Government. Besides doing much work independently, they cooperate heartily with this department in research by division of effort and also by participating in unified plans. Work thus correlated shows gratifying results. Fully 12 per cent of the research projects of the experiment stations are conducted cooperatively with the department. In this

way two great systems for agricultural investigation function in close harmony in properly balanced and well-rounded research programs.

Great expansion and development of research at the State experiment stations has resulted from the Purnell Act of 1925, which opened new fields of investigation and made it possible to attack vital questions from many angles. Fundamental research as distinguished from studies having an immediately practical objective has assumed a larger place in the work of the experiment stations. This is in accord with the experience that investigations designed to establish basic facts and principles may have more practical significance than hasty attempts to settle farm questions by short-cut methods. Essentially the distinction is not between what is practical and what is not, but what is practical in a narrow and what is practical in a wider sense. Fundamental research may not affect agricultural practice quickly in all cases. Its ultimate value, however, is sure. Certain fundamental studies launched in the experiment stations have created nation-wide interest and have led to investigations over wide regions.

An example is a series of experiments conducted at the Missouri station several years ago to determine the run-off and erosion of soils under varying conditions. This inquiry yielded results which caused it to be taken up as a national project on an extensive scale. Thus enlarged the investigation has great promise of saving fertility and conserving water supplies. Another example is a fundamental inquiry on animal metabolism initiated at the Pennsylvania experiment station. This study likewise stimulated extensive and varied investigation elsewhere. Investigators at the Wisconsin station opened up a fruitful vein by studying differences in the effects of rations derived from various plant sources. These differences were traced to variability in the elements of nutrition now called vitamins, the importance of which has profoundly influenced our viewpoint in animal and human nutrition. Research results thus pooled in the common fund of scientific knowledge pay high dividends.

Stability in Financial Support

Prominent among the factors contributing to the scientific success of the experiment stations is the stability of their financial support. The amount of Federal funds expended by the stations is determined by basic legislation. Thus assured of continuing support, the stations can plan ahead with confidence. Under the supervision of local authorities they enjoy wide freedom in choosing subjects for investigation and in deciding how the work shall be done. They can direct research to specific ends, though it may take years to reach the goal. They can change the course of their inquiries as circumstances require. This does not mean, as some critics maintain, that research projects once authorized and started are never completed but become a continuous charge. In the last year the experiment stations reported the completion of 130 projects supported by Federal funds. In other words, opportunity for research to follow its logical course is quite consistent with definiteness and a reasonably limited range. Comparative freedom of inquiry and security of

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funds have been found entirely compatible with a research policy looking toward the completion of projects.

The Purnell Act, which is supervised for the Federal Government by this department, has broadened the work of the State experiment stations to include a study of economic and social problems. This is an extremely important development, because the advancement of agriculture to-day can not be accomplished by technical progress alone. It is necessary also to maintain a proper adjustment between production and market requirements, to regulate the marketing of commodities, and to establish equitable relationships for agriculture in matters of taxation, transportation, tariffs, etc. It is therefore a good augury that the experiment stations are conducting under the Purnell Act an extensive and systematic study of the economics of production. They are investigating marketing practices, taxation, land utilization, and types of farming. In the last year more than 120 station bulletins were published on work of this character. Recent developments in agriculture have emphasized the fact that farm production, no matter how efficient, does not attain its proper end until the products have been profitably distributed. The economist and the production specialist must work in close alliance. Production experiments may be safely applied only when they have been proved to be economically sound. On the other hand, radical changes in farm practice can not be recommended for economic reasons unless they are supported on the production side. This necessity for coordination between production technic and economic science is a guiding principle in the work of the experiment stations as directed under the Purnell Act, and the resulting benefit should be very substantial.

Some Economics Studies Under Purnell Act

Research in home economics carried on by the experiment stations has received a strong impetus under the Purnell Act. Investigations are progressing covering all phases of the farm woman's activities. Foods and nutrition, rural home management, textiles and clothing, rural welfare and country living, and kindred subjects bulk large among some 100 separate research projects now going forward. In several States investigations have been started to determine the bread-making qualities of different wheats. Other inquiries have to do with the quality and palatability of meat. Two general types of nutrition projects, the first involving laboratory investigations and the second consisting of field studies of dietary habits, have been launched. Much interest has been aroused by experiment station work on the food habits of children. At the Massachusetts station an investigation of the food consumption and health of rural school children disclosed serious inadequacies. It led to a broad study of the feeding and transportation of children in elementary schools and aroused wide interest among school superintendents. An analysis of the food consumption and the expenditures of rural families is being made by several experiment stations in collaboration with the Federal Bureau of Home Economics. Work done at the Cornell station on farm standards of living was followed by a considerable grant of State funds to supplement Purnell Act funds in a more

extensive investigation. Promising inquiries are under way concerning the use and economy of electrical equipment in the farm home.

Stations in Outlying Territories

In the Nation's outlying territories and in the islands of Hawaii, Porto Rico, Guam, and the Virgin Islands, the United States Department of Agriculture maintains experiment stations discharging functions similar to those fulfilled by the State stations. Valuable service was given by the experiment station in Porto Rico in restoring the island's agriculture after a devastating hurricane in September, 1928. Coffee plantations suffered great losses by the destruction of trees. It became the duty of the experiment station to advise farmers in regard to the restoration of trees not too badly broken, the preparation of seed beds, methods of transplanting, choice of shade trees, use of fertilizer, etc. Losses to citrus and pineapple growers were lessened by prompt action taken to save trees that had not been too much damaged. Many trees that had been blown over were straightened, pruned, and supported until roots developed, and were stimulated to rapid growth by the application of fertilizers. Help in solving the food problem created by the hurricane was given by the experiment station. It advised farmers as to the crops that might be planted to secure early returns.

Authority for the Territory of Hawaii to share in the Hatch and supplementary acts was given by an act of Congress approved May 16, 1928. The legislature of the Territory designated the University of Hawaii to receive the funds thereby appropriated. It is required by the act that the station shall be conducted in collaboration with the Federal experiment station in Hawaii on cooperative plans approved by the Secretary of Agriculture. Accordingly, the two stations, by agreement between the department and the university authorities, were merged for the purposes of their agricultural work. This is known as the Hawaiian Agricultural Experiment Station and is conducted jointly by this department and the University of Hawaii. The director of the Federal experiment station became director of the joint institution. Several members of the university faculty were added to the staff of the experiment station. Various research projects to be undertaken by the new organization have been approved, and the work has started under favorable auspices. This arrangement should be advantageous to the Department of Agriculture, because it offers an opportunity to develop a strong experiment station where tropical investigations can be carried on.

By an act of Congress approved February 23, 1929, benefits of the Hatch Act are to be extended to the Territory of Alaska. It is provided in the law "that no appropriation shall be made until estimated by the Secretary of Agriculture, the estimates to be based on his determination of the ability of the Territory of Alaska to make effective use of the funds." Plans contemplate the establishment of a new station. An experiment station has been operated by the department since 1907 at Fairbanks, Alaska, and it is proposed that this shall be merged with the new organization. The

program, however, requires Territorial appropriations for buildings and maintenance, and for some enlargement of personnel, so that research work can be carried on after the department withdraws. A bill for that purpose was introduced in the Legislature of Alaska at its recent session, but it failed to pass.

INFORMATIONAL SERVICES

Since the final test of science is practice, it is obvious that the research done by the department depends largely for its value on the efficiency with which its results are communicated to the public. Accordingly close contact is maintained between the department's scientific workers and practical men in agriculture, industry, and trade through a comprehensive information service. In this way the practical applications of scientific discoveries are made known, and scientific workers everywhere are apprised of the results achieved by their coworkers in this department. Thus duplication of effort is avoided and discoveries in one field of knowledge exert an influence on other fields promptly.

Though most of the department's work has informational aspects, a distinction may be drawn between teaching such as is carried on by the extension services and the informational work carried on through publications, the press, radio broadcasting, motion pictures, weekly and monthly periodicals, lectures and articles by department workers, correspondence with individuals, regulatory law administration, and crop and market news, and outlook reports. This work has increased measurably during the last year, though not sufficiently to keep pace with the demand. In the last half decade the department's research and regulatory work, and some other activities, have grown much more rapidly than its facilities for publishing the results. In consequence publication work is heavily in arrears, and it is unfortunately necessary to hold many important manuscripts in abeyance. A recent study indicates that 1924 was the last year in which a good balance existed between the general activities of the department and publication of the results achieved. Funds available for printing and binding have not been increased since then, though annual expenditure for research has been increased by $5,000,000, and the expenditure for department work in general, exclusive of Federal-aid roads, by $20,000,000. Indications are that the accumulation of important knowledge will outrun publication facilities to a greater degree in the current fiscal year than it did in the fiscal year ended June 30, 1929.

Information work done by the department is nevertheless very extensive. In the last fiscal year it distributed free more than 25,000,000 bulletins, circulars, periodicals, and other publications. In addition the Superintendent of Documents sold more than a million copies at prices barely covering the cost of printing. Senators and Congressmen distributed the department's publications widely, particularly the Yearbook, which has a circulation of about 400,000 copies. This volume contains the annual report of the Secretary of Agriculture to the President and numerous brief articles on recent progress in agricultural science and practice, as well as much up-to-

date statistical material. The 1928 Yearbook was the third in a series intended primarily to inform the practical farmer about what is new in agriculture.

Publishing Research Results

The results of fundamental research conducted by the department are published in technical bulletins and in the Journal of Agricultural Research, and popular material is issued in farmers' bulletins, leaflets, and circulars. In the fiscal year 1929 the distribution of farmers' bulletins alone totaled more than eleven and a quarter million copies. Much additional material, both technical and popular, was issued in mimeographed form. Yet the appropriation for all the department's printing, for all its purchases of machinery required in mimeographing, multigraphing, etc., and for the salaries of editors and other employees engaged in informational work amounted to only about 0.8 of 1 per cent of the department's total appropriation. A recent study of the relative effectiveness of various extension methods shows that the printed word is by far the cheapest and quickest method of leading farmers to adopt better farm practices. It would be true economy to increase the department's facilities for informational work.

The Press Service

Public interest in agricultural questions has grown tremendously in recent years, and the press has carried much more agricultural material than previously. Accordingly the department's press service, a division of the Office of Information, has been able to reach a wider reading public with newspaper and magazine articles and other material prepared for daily and periodical publications. A study was made of the agricultural news, editorials, feature material, etc., carried in a number of important daily newspapers in the last seven days of June, 1929, as compared with the amount of similar material carried by the same newspapers in the corresponding seven days of June, 1919. The increase in agricultural news material alone in 11 important papers exceeded 90 per cent. There was also a large increase in editorial and feature material on agriculture and in agricultural market news. Much material supplied by the department's press service was carried regularly in the feature services of the large press associations, and numerous syndicates cooperated in distributing agricultural information. A gratifying aspect of this development was increased accuracy in agricultural reporting and feature writing. During the fiscal year the press service issued for general circulation or for wide circulation in farm journals and trade publications more than 1,000 mimeographed releases, as well as a weekly printed Clip Sheet and many special articles and reviews of department bulletins. It also issued weekly the Official Record, which reports department activities, and numerous statements by the Secretary and other department officials. The press service is in no sense a publicity agency in the usual meaning of that term. Its work is confined strictly to the dissemination of research re-

sults, current economic information, and other useful knowledge. Besides issuing prepared material, the department furnished data for numerous special articles by outside writers. Specialists in the department contributed more than 1,300 articles to various outside publications.

Developments in Radio Service

Outstanding developments took place during the fiscal year in the department's radio service. Chief among these developments was the inauguration of broadcasts through one of the great commercial chain-broadcasting systems. Previously the department's radio programs had been supplied to broadcasting stations in manuscript. In October, 1928, when the National Broadcasting Co. placed at the department's disposal a network of 17 stations for a 15-minute broadcast 5 days a week, it became possible for members of the department to broadcast material in person. Approximately 200 members of the department and 18 guest speakers appeared before the microphone in this broadcasting program. Thus timely material, including crop reports, outlook reports, etc., was brought to the attention of the farmers immediately. Much valuable information on farming and home making was widely broadcast. In January last a broadcast over a network of 38 stations extending from coast to coast gave nation-wide circulation to the department's national outlook report on domestic and foreign business and agricultural conditions. In June a network of 42 stations transmitted a program arranged in connection with the second annual national 4–H club camp. Manuscript radio programs distributed to broadcasting stations in various parts of the country gave additional radio circulation to the department's work. Special service on local agricultural problems was given to cooperating broadcasting stations.

COOPERATIVE EXTENSION

One of the strongest influences in agricultural improvement is the extension service. Through this agency the department and the State agricultural colleges cooperate in demonstrating to farming people the latest and best farm and home practices developed from the experimental activities of these institutions. Extension work is a relatively new educational development; yet recent surveys show that already more than 75 per cent of all farm families have been benefited by it in some manner.

In assisting farmers to attain the standard of living to which they are justly entitled, extension agents very properly devote their efforts largely to the development of programs of extension work which have for their aim a larger farm income. Results of economic studies made during the last 15 years have furnished extension workers with facts upon which numerous State, county, and community extension programs are based. During the year the organization of local farm enterprises, market needs, price trends, and other economic matters were studied to provide the extension agent with a basis for his recommendations for readjustments in the size, volume, or organization of farm businesses. Data issued by the department forecasting the intentions of farmers to plant crops and breed livestock were also largely used.

County agricultural agents advised more than 68,000 farmers regarding the organization of approximately 800 cooperative-marketing associations during the year. Counsel was also given to 2,136 cooperative-marketing associations that were previously organized.

In the Red River Valley of North Dakota, extension agents helped 1,168 farmers to purchase cooperatively 60,000 sheep. Thus, a new farm enterprise was established in a 1-crop farming area. North Dakota also marketed 250,000 pounds of wool cooperatively. In Minnesota, a cooperative purchasing association, organized with the advice and counsel of the extension agent, saved the farmers of Itasca County, $16,000.

Extension effort was devoted to increasing the fertility of the soil through stimulating the use of lime, fertilizers, and green manure. As a result of demonstrations carried on by the extension force during the year more than 300,000 farmers adopted better soils practices for the first time, an increase of almost 27,000 over the number who adopted such practices for the first time last year. The application of lime continued to be one of the outstanding phases of soil improvement in the Central, Eastern, and Southern States. Farmers were helped in testing their soils for lime requirements and in purchasing limestone at reasonable prices. They were also taught the value of using high-analysis fertilizers. In fact, the change in many areas from low-grade to high-grade fertilizers has been due largely to demonstrations and campaigns carried on by the extension service.

Problems Given Special Attention

The problem of producing an increased supply of home-grown roughage for dairy cows again received much attention by extension workers; as did the growing of sweet clover and alfalfa hay and the improvement of pastures as a means of reducing feed costs. The control of diseases, especially tuberculosis of dairy cows and contagious abortion, was promoted through the cooperative effort of county extension agents and Federal, State, and county veterinarians. Better feeding, dairy-herd improvement through testing associations, sanitary production and care of milk, better-sires campaigns, better-breeding programs, and improved construction of dairy buildings were other phases upon which county extension agents centered their efforts during the year. Nearly 500,000 farmers accepted and put into practice the modern and efficient dairy methods taught by extension workers. Similarly, assistance was given to growers of fruit, vegetable, and field crops, to poultry raisers, and to producers of beef cattle, swine, and other livestock.

Farm life is not solely concerned with production, selling, and buying, but with many other features which make living in the farm home more comfortable, more attractive, more enjoyable, and more beautiful. Through its home demonstration agents located in many rural counties, the department comes in direct contact with the farm family, discovers their basic problems, and helps them to work out solutions. Health, for instance, is an important asset in rural contentment and efficiency. Home demonstration agents aided the rural home maker to select and prepare correctly the proper foods to maintain a well-balanced and healthful diet. From the standpoint

of both health and economy, farm people were urged to produce their own supply of eggs, milk, meat, vegetables, and fruit, to maintain proper storage facilities, to can perishable fruits and vegetables, and to home cure their meat. Demonstrations in breadmaking, meat cutting, the preparation of milk dishes, and salad making were given. Women were trained in meal planning, child feeding, maintenance of normal weight in children, the use of corrective diets, infant feeding, preparation of hot school lunches, and the use of a food budget. Instruction was given in sanitation, home nursing, and first aid, and child clinics and dental clinics were arranged in cooperation with local physicians, dentists, and nurses.

Home Improvement Assisted

As a means of conserving the home maker's time and energy and to give her more leisure for relaxation and constructive use, home demonstration agents helped many women to rearrange their kitchens, install modern home equipment, and to rearrange for greater efficiency the sequence of their daily tasks. Business methods were introduced in the farm home. The installation of inexpensive, practical lighting, heating, water, and sewage systems was demonstrated. Farm women were shown also how to improve the appearance of the farmstead, both inside and out.

Especially popular among women and girls were various phases of clothing extension work. These included the making, care, and renovation of clothes, the construction and trimming of hats, home dyeing, making of infants' and children's clothing, repair of furs, and other features which have brought to farm women and girls a better understanding of clothing in relation to health, harmony of color and design, suitability to the occasion, and economical buying.

Farm women took active interest in numerous other community activities seeking to promote the comfort and efficiency of farm families and better their social and economic life. They acted as demonstrators, assumed the responsibilities of local leaders, participated in community programs, attended short courses at the State agricultural college, took tours to neighboring homes demonstrating the best practices, made community exhibits, attended rally days, and sponsored picnics.

In addition to working with adult farm men and women, the extension service, through its boys' and girls' 4–H club work, provided an opportunity for juniors to participate in the benefits of extension activities. Like their parents and neighbors, these young farm boys and girls of 10 years of age and over met in groups, discussed their problems, presented solutions, and planned ways in which they could be of greater service to their communities. More than ever, 4–H club work was recognized by the public as a vital factor in the educational development of the farm boy and girl and an important force in the improvement of rural life.

During the year 46,670 groups were organized into 4–H clubs. The total enrollment was 663,940, an increase of approximately 44,000 over the enrollment in 1927. Of the number enrolled, 67.4 per cent completed all the work assigned to them, as compared with 64.4 per cent who completed the work in 1927. Assisting the co-

operative extension agents in training these club members were nearly 60,000 local leaders who voluntarily gave their time and effort to the work. Many of these local leaders were former club members.

Funds for Extension Work

The total funds available for cooperative extension work from all sources during the fiscal year were approximately $22,918,200, an increase of about $2,000,000 over those for the previous year. Approximately $1,500,000 of this increase was in Federal funds and $500,000 in State and county funds. The Capper-Ketcham Act of May 22, 1928, made $980,000 of Federal funds available July 1, 1928, and Congress appropriated an additional $280,000 of Federal supplementary funds. The remainder of the increase in Federal funds was for the employment of agents in counties in the flood-devastated areas. Of the total funds, 39 per cent, or $8,978,363, was contributed by the Federal Government, and 28 per cent, or $6,405,825, was from State appropriations to the agricultural colleges and other State agencies. The remaining 33 per cent, or $7,534,012, came from county appropriations for extension work and from contributions by local organizations and individuals. About 94.5 per cent of all funds used for cooperative extension work in 1929 came from public sources.

The entire State field staff on June 30, 1929, numbered 5,691 persons, an increase of 530 during the year. Of this number 4,170 were located in the counties, of whom 2,452 were in county agent work, 1,167 in home demonstration work, 252 in boys' and girls' club work, and 299 in negro extension work. The work of county extension agents was supplemented by the work by 825 full-time and 212 part-time subject-matter specialists located at the State agricultural colleges. There were 109 supervisors and assistant supervisors and 75 administrative officers and assistants. During the year there was an increase in the field staff of 495 county workers, 2 administrative and supervisory workers, and 33 subject-matter specialists. Of the 495 new county workers added 77 were county agricultural and 57 assistant county agricultural agents, 12 negro county agents, 201 county home demonstration and 25 assistant county home demonstration agents, 17 negro county home agents, 95 county boys' and girls' club agents, and 11 assistant club agents.

Educational Films Distributed

From its motion-picture laboratories the department distributed more than 3,500 shipments of films during the year, which were exhibited to approximately 5,000,000 persons in all parts of the United States. In addition to lending films the department approved requests for the purchase of 298 films. These were bought principally by educational institutions and by foreign governments.

Twelve new films consisting of 26 reels were produced and released during the year. They included Traveler's Toll, Naturalized Plant Immigrants, Home is What You Make It, Under the 4–H Flag, The Master Farmer, How About a Combine, and several films on rust, barberry eradication, land clearing, testing bridges, care of chicks,

and bamboos. Motion-picture films on about 250 subjects covering all phases of farm and farm home life are now in active circulation.

The department showed exhibits to millions of people at 74 fairs and expositions widely distributed throughout the United States during the year. These exhibits utilized the newest devices to impart in an interesting manner the latest and most authentic information on a variety of agricultural subjects. Those which attracted the most attention and which were in the greatest demand during the year were the Milk Factory and the Brood Sow's Rebellion. The exhibits were representations of animals operated mechanically and synchronized with amplified talks.

A special exhibit was prepared for the Ibero-American Exposition at Seville, Spain. This exhibit portrayed agricultural methods used in the United States and featured such subjects as wheat, corn, cotton, tobacco, sheep and wool, poultry, hogs, livestock, sanitation, history and development of the livestock industry, dairying, road building, and experiment-station work. A new motion picture, Naturalized Plant Immigrants, was prepared especially for showing at the Seville exposition, and 25 of the department's films were shown there.

WEATHER FORECASTS

Issuing weather forecasts and warnings for the benefit of agriculture and commerce and of navigation by sea and air has been much facilitated recently by an increased use of radio communication. This has enabled the Weather Bureau to serve the farmers and the rural population and the general public with a promptness never before possible. Long-established services, such as the dissemination of frost warnings, harvest-weather forecasts, warnings of cold waves, and forecasts of minimum temperatures, have gained increased utility. The bureau's forecasts of storms and hurricanes and its flood-reporting service have likewise been more readily disseminated.

The furnishing of weather information for the benefit of navigation on large inland lakes and on the oceans has been carried on by the Weather Bureau for many years. It always has been difficult to get an adequate number of observations from ocean areas. Only by means of weather reports from ships can the conditions prevailing over ocean areas be determined and storm centers located. Marked developments were made in this work during the past year, largely as a result of a better understanding reached among national meteorological services. In 1928 representatives of the Weather Bureau participated in conferences held in Paris and London for the purpose of effecting better international cooperation. Officials of the meteorological services of the principal maritime nations of Europe attended the meetings and made arrangements whereby each country will engage a certain number of ships of its own registry on which observations will be taken daily at fixed hours and transmitted by radio. The ships selected will be equipped with standardized meteorological instruments and long-range radio apparatus.

The organization of such a cooperative service was first begun for the North Atlantic Ocean, and principally for the areas included in

the steamer routes between the United States and Europe. Previously few of the ships plying these routes furnished weather observations by radio. This made it difficult for the Weather Bureau to provide the information desired by shipping interests and to give adequate service in connection with trans-Atlantic airplane and dirigible flights. Frequently only two or three reports a day were available from this immense ocean space. Seldom were a dozen reports received.

Prospects for More Ship Reports

As a result of the new plan nearly 20 ships of United States registry, about 24 British vessels, and 5 French ships now report regularly twice a day. Many more, including those of other nations, will be engaged within a year. All the ships, regardless of nationality, radio their observations to the Weather Bureau in Washington when west of longitude 35°. When the ships are east of that line, the reports are radioed to some designated European meteorological office, which makes them available to other services by broadcast on established schedules. The reports received by the Weather Bureau are made available to European meteorologists by a bulletin broadcast twice daily from the Weather Bureau office through the Navy radio station at Arlington, Va. Besides the ocean data the bulletins contain weather observations made at a large number of land stations in the United States and Canada. In turn a bulletin containing European reports and the ship observations taken in areas east of longitude 35° is radioed from France for the benefit of the United States Weather Bureau. It is planned to extend the international organization to the Pacific and other oceans. At present reports from ships in the southern area of the North Atlantic Ocean, the Caribbean Sea, and the Pacific Ocean are obtained exclusively through arrangements organized by the United States meteorological service.

Aeronautical meteorology has expanded greatly since the passage of the air commerce act, which provides for designation by the Department of Commerce of various commercial airways and airports necessary for the air mail and other air transport. The act also provides that the Weather Bureau shall issue weather information and warnings necessary for safe flying over these courses. Accordingly the basic system of weather reports at 8 a. m. and 8 p. m. is now supplemented by more frequent observations from selected stations. The program, now well under way, provides for a model service along the great transcontinental airway from New York to San Francisco and Los Angeles, a zone about 300 miles broad. Seventy-five stations within this zone make reports at 3-hour intervals to certain major airports or control stations. Through radiobeacon and broadcasting facilities established and operated by the Department of Commerce, pilots in flight, even in thick weather, can pick up weather reports while holding their courses.

This intensified service is now being operated only on the transcontinental line. A similar service will be developed for the important feeder and transverse lines as flying over those lines develops and funds become available.

WILD-LIFE CONSERVATION

Wild life is both a recreational and an economic asset. Its conservation should be considered in all programs for the development of public and privately owned land and water areas. Fortunately this is coming to be widely recognized. Heretofore our dealings with wild-life resources have been wasteful and without forethought. Now a new era is upon us, characterized by a definite policy based on fact-finding through biological research. Public opinion sees the importance of replacing the former enormous waste of wild life by a constructive program of recreation and development associated with wise use. Such a program should emphasize the part that wild life can play in supplementing agricultural production, in adding to land values, and in maintaining opportunities for outdoor recreation. This can be done by increasing the production of wild life and conserving adequate breeding stocks.

Investigations conducted by the Department of Agriculture through the Bureau of Biological Survey have resulted in the accumulation of much valuable information. Continuous research enables the department to deal constructively with the problems of hunting or trapping seasons, bag limits, maintenance of breeding stocks, harvesting the annual crop of surplus wild life, and facilitating the maximum production of game birds, fur-bearing animals, and other mammals consistent with due regard to other interests. The department makes comprehensive studies of big-game animals such as elk, deer, and antelope, to ascertain their numbers, habits, movements, and food requirements. Attention is given also to the diseases and parasites of wild animals and to the influence of predatory creatures on game species. Waterfowl studies include surveys of the numbers, distribution, and migratory movements of geese, ducks, swans, coots, and other birds in this country and Canada. Six thousand volunteers report on conditions observed in waterfowl censuses, or operate trapping stations where, under permit, birds are banded and released as a means of learning about their migrations. Officials of the national parks of Canada, and other agencies in that country and in Newfoundland cooperate in the work.

The Necessity of Research

Research is necessary for the control of injurious species and for the protection of useful animals and birds. Investigations with this end in view have been carried on for nearly half a century. Comprehensive reports have been made on the food habits of more than 200 species and briefer mention of more than 500. This work is the foundation of our advanced bird-protective laws and regulations. In order that the number of beneficial birds may be increased, the Biological Survey studies their food supplies. Information thus gained about the food plants of wild fowl has led to the improvement of their feeding ranges and has solved many problems connected with the establishment of practical bird refuges. Bird attraction through the provision of suitable bird houses has been much studied, with notable results.

It has been demonstrated that by using relatively simple methods farmers can increase the production of game on land suited to

that purpose. Lands can thus be made desirable for leasing to sportsmen, a growing though not yet extensive practice in the United States. In pheasant farming it is possible to rear a small number of birds without the expensive equipment commonly required on pretentious game farms. Further study is necessary to develop better methods of handling small game on the farm. Research is in progress to learn the types of cover most favorable. Study of the diseases of wild birds is important. Such diseases sometimes cause the death of thousands of birds, especially migratory wild fowl, at concentration points. An example was the alkali poisoning of ducks in the Bear River Marshes, Utah. Investigations revealed the cause and indicated remedial measures. Studies of the food habits of animals throw light on their economic significance. It has been demonstrated, for example, that toads are about as valuable individually during their active season as are most birds. Certain species of snakes, at present widely persecuted, have economic value. Some small mammals also are beneficial.

In order to meet more effectively the obligations of the United States under a treaty with Great Britain, the Seventieth Congress passed a bill (45 Stat. 1222) to create in perpetuity absolute sanctuaries for migratory birds. This measure, called the migratory bird conservation act, authorizes appropriations for the examination of areas that might be suitable as bird refuges. It also provides for the acquisition of areas that are found through investigation to be adequate for the purpose of affording perpetual sanctuaries for migratory birds. The act contemplates a refuge-acquisition program extending over a period of 10 years and will result in the establishment of a Federal system of wild-fowl sanctuaries throughout the entire country. The investigational work is in progress. Field parties are making detailed reports on the variety, distribution, and abundance of aquatic and marsh vegetation. Land-valuation engineers are investigating areas found desirable from the biological point of view. This inquiry will indicate the feasibility of acquiring tracts for refuges by purchase, lease, or gift. Other studies necessary under the bill will accumulate additional information about the fly ways of the birds and their food requirements. Data already gained leave no doubt as to the most desirable refuge areas in the various stages of the migratory flights.

The McSweeney-McNary Act

One of the most far-reaching legislative measures taken in recent years for scientific research is the McSweeney-McNary Act (45 Stat. 699). Among other requirements, this act calls for a comprehensive study of fundamental biological facts and principles governing forest wild life. Accordingly the Biological Survey has planned an orderly and sustained investigation on forest fauna. This will seek to determine the kinds of birds, mammals, and other vertebrates that make up the animal population of forest areas.

Though the destructive work of rodents and predatory animals is the most conspicuous relationship between forests and forest fauna, it is not necessarily the most important. Frequently the beneficial activities of wild life overshadow the destructive activities. Hence the research program will pay much attention to the service rendered

by resident and migratory birds and by animals that prey upon destructive insects and rodents.

Gradual upbuilding of the wild life of Alaska is in prospect under the Alaska game law enacted in January, 1925. Alaska's game, fur, and bird life ranks among the most valuable of its products. Trapping is an important industry in most parts of the Territory. In large sections game animals and birds furnish an important share of the human food supply. These creatures were being rapidly depleted in numbers prior to the enactment of the Alaska game law. Some species were threatened with extermination. Work already done under the new dispensation is thought to have checked the decline of the fur and game animals. Continuation of the present policy should permit their increase. Prior to 1925 the fur and the game in Alaska were administered under separate and inadequate laws. The whole field is now under the jurisdiction of the Alaska Game Commission, whose policy is well supported by those interested in the development of Alaskan resources. Though carried on with limited personnel, the commission's law-enforcement work is excellently supported by the courts.

The commission constantly emphasizes the fact that the maintenance of an abundant supply of wild life is an economic advantage to Alaska and brings many other advantges. It has shown that under wise management large portions of the Territory that might otherwise be unproductive can produce valuable annual crops of fur and game indefinitely. Ready acceptance of these views by the people of Alaska has greatly facilitated the commission's work. During each of the past three bienniums, the Territorial legislature has appropriated large sums for stocking areas with valuable fur and game animals. Last year, through cooperation with the Biological Survey, 23 buffalo were shipped from the National Bison Range in Montana to Alaska. Four were put in the Reindeer Experiment Station at College, Alaska, and the rest were liberated near Fairbanks. The herd thrived on the natural feed of the region, withstood the rigors of the winter, and entered the new season in good condition. Increased protection for the big brown bears of Alaska is provided in regulations issued by the Secretary of Agriculture. At the same time landowners and stockmen are authorized to protect themselves and their property against these huge animals.

Fur Farming Well Established

Fur farming is now established in the United States as a permanent agricultural enterprise. It is carried on both as a side line to farming and as a main crop in areas unsuited to cultivation. Fur farms are operated in all sorts of locations, particularly in the cooler latitudes and in mountain country. Some large farms have been converted into fox ranches with hundreds of pens. Many small ranches are on general farms. It is estimated that about 5,000 farmers in the United States and Alaska raise one or more species of fur animals. The majority raise silver and blue foxes. The total investment in fur farming exceeds $20,000,000, and last year fur farms in the United States and Canada produced approximately 80,000 silver-fox pelts. All persons interested in fox farming should carefully consider these facts, so that precautions may be taken to

avoid overproduction and serious damage to fur farming as a permanent industry. Steady development, however, seems desirable. As fur farming progresses—while on the other hand the haunts of wild life are restricted—the tendency of the fur trade will be more and more to obtain supplies from the fur farms.

Domestic rabbit production for both food and fur has developed in the last few years into an important industry in various parts of the United States, especially in California and the Middle West. Rabbit fur is in general demand, and a market exists for rabbit meat in parts of the country, notably in San Francisco, Los Angeles, Seattle, and Portland.

Predatory Animals

Predatory animals and rodents continue to take a heavy annual toll. It is estimated that coyotes, wolves, mountain lions, bobcats, and some stock-killing bears cause an annual loss of more than $20,000,000. This figure allows for the inroads of predatory animals on game and on ground-nesting and insectivorous birds, as well as on sheep and lambs, cattle, pigs, and poultry. In 1916 the Biological Survey began to build up a field force for the control of predatory animals. Predatory-animal districts, each in charge of an experienced leader, were organized in the principal western livestock-producing States. Hunters are not paid on a bounty system, but devote their entire time to the work. Poison campaigns have been increased and made more effective. The result is a large reduction in the number of coyotes and other predatory animals in the sections covered. Livestock losses have decreased correspondingly.

Losses running into the hundreds of millions of dollars annually are caused by ground squirrels, prairie dogs, jack rabbits, pocket gophers, woodchucks, porcupines, mice, and rats. Control of these animals is one of the surest means of reducing the production costs and increasing the profits of agriculture. Much has been accomplished by the department in cooperation with farmers and other landowners. Rodent pests have been exterminated on millions of acres of valuable agricultural land. In the past year nearly 100,000 farmers took advantage of opportunities offered them to wage cooperative warfare on these pests under trained leadership.

Cooperative-Control Program

The Seventieth Congress called for an investigation as to the feasibility of a cooperative-control program extending over five or more years. The investigation was made, and a 10-year program was recommended. The object would be to prevent the constant reinfestation of cleared areas as well as to clear additional areas. Though complete eradication of predatory animals is not practicable, and in some areas is not desirable, a more comprehensive and drastic control policy than that now in force is required

FEDERAL-AID ROADS

The Federal-aid program of road construction is being advanced as rapidly as the authorized funds permit. In the fiscal year ended June 30, 1929, the addition of mileage initially improved with Fed-

eral assistance amounted to 7,402 miles. This brought the total mileage initially improved since the inception of the Federal policy to 79,796 miles.

A portion of this initially improved mileage, to which aid was granted prior to the designation of the Federal-aid system in 1921, consisted of roads which were not of sufficient importance to be included in the system. To relieve the States of the further necessity of maintaining roads of this character, 485 miles were abandoned as Federal-aid highways during the past year, thus reducing the retained mileage to 79,311. The initially improved mileage has been further reduced by relocations made in the course of stage construction (the making of secondary improvements) by a total of 47 miles; and at the close of the year 1,168 miles was in course of further improvement. Hence the mileage which, for want of a better term, is classified as completed was only 78,096. At the close of the preceding year the mileage similarly classified was 71,074. Hence the net addition of " completed " mileage was 7,022.

Stage construction has become important in the Federal-aid program. It should not be confused with repair or reconstruction, but should rather be considered as deferred construction. The deferment is in accordance with a deliberate policy of construction by stages, a logical answer to the dual necessity for some improvement of a mileage as great as possible, and for the betterment of original improvements to keep pace with increasing traffic. Secondary improvements were completed during the year on 1,988 miles of road.

Increases in Various Types of Construction

The net increases in the several types of construction during the year were as follows: Graded and drained roads, 1,056 miles; sand-clay roads, 562 miles; gravel roads, 1,293 miles; water-bound macadam roads, 189 miles; bituminous macadam roads, 528 miles; bituminous concrete roads, 201 miles; Portland cement concrete roads, 3,101 miles; brick and other block pavements, 48 miles; and bridges, 44 miles; a total of 7,022 miles.

The total mileage classed as completed at the close of the year is as follows: Graded and drained earth roads, 11,667 miles; sand-clay roads, 7,033 miles; gravel roads, 28,991 miles; water-bound macadam roads, 1,616 miles; bituminous macadam roads, 4,845 miles; bituminous concrete roads, 2,194 miles; Portland cement concrete roads, 20,618 miles; brick and other block pavements, 866 miles; and bridges, 267 miles; a total of 78,097 miles.

The total cost of the 7,402 miles of initial improvements and the 1,988 miles of secondary improvements completed during the year was $195,298,168, of which sum $82,736,878 was paid by the Federal Government. These payments extended over the period of between one and two years required to complete the improvements. In addition to the payments made during the last year on these projects, payments were also made on other projects not yet completed. The total actual disbursements of Federal funds to the several States during the year amounted to $82,097,380.

The expenditure of more than $82,000,000 is approximately equal to the disbursements of the past several years. The sum apportioned for each of the years since 1925 has been only $73,125,000 (admin-

istrative expense not included). A higher rate of expenditure has been made possible by a large unexpended balance carried over from earlier years. This balance has permitted construction costing from $80,000,000 to $90,000,000 annually. But the accumulated balance is now exhausted. It is therefore necessary to shape the construction program in accordance with the amount of the annual authorization. Unless the authorization—for the past several years $75,000,000—is increased, it will be necessary materially to reduce the rate of road improvement. A reduction has in fact already occurred. Obligations incurred for new projects during the last fiscal year amounted to only $70,429,896, the lowest amount annually obligated since the fiscal year 1923. For the first time since that year the amount obligated is within the amount apportioned. This curtailment foreshadows a reduced expenditure next year and in succeeding years unless the annual authorization is increased.

Construction Appropriations Authorized

Appropriations authorized for road construction in the national forests have for several years been limited to $7,500,000. Of this sum, $3,000,000 is reserved for building roads and trails required in the administration, protection, and development of the forests. The remaining $4,500,000 is devoted to the construction of main highways extending through the forest areas to form necessary links in the Federal-aid and State highway systems, and to serve communities within and adjacent to the Federal reservations. Such highways constitute a system of 14,165 miles, of which 11,780 miles are in the 12 States of the mountain and Pacific groups and Alaska.

Including the 315 miles of such roads improved during the past year, the total thus far improved is only 4,091 miles. Much of the remainder is totally unimproved and practically impassable by motor vehicles. The current rate of improvement is the maximum possible under the present scale of appropriations, but it falls far short of the progress being made in the improvement of the adjoining Federal-aid and State highways. Forest areas thus tend to remain as barriers to transportation. A similar situation exists with reference to needed connections across Indian reservations and unappropriated public lands.

Federal aid was extended last year in the construction of bridges and their approaches covering more than 44 miles. The year's construction brought the total length of all completed Federal-aid bridges up to 267 miles.

Private Capital in Bridge Building

The construction of major bridges is an expensive undertaking which the State governments have difficulty in financing with current revenues. Faced with an urgent demand for the improvement of thousands of miles of roads, they often find bridge costs burdensome. In consequence, private capital frequently grasps the opportunity to supply the needed structures and charge toll for their use. A survey of all existing toll bridges made two years ago by the Bureau of Public Roads showed that more than half the number

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were on the Federal-aid highway system—a condition to be expected in view of the traffic importance of these roads.

It is not sound policy to permit the establishment of private toll bridges at commanding locations on roads improved at great public expense. The ultimate cost to the public exceeds what the cost of public construction and operation would be.

If current State revenues are insufficient for bridge construction, needed funds can be borrowed on the security of anticipated returns in publicly collected tolls. Such borrowing can be done on terms more favorable than those usually available to private builders. Under a recent amendment of the Federal highway act Federal aid can be obtained for bridges financed in this manner. The sum to be raised by tolls can be thereby reduced by half. Whatever method may eventually be adopted, it is obviously desirable that the opportunities for the public construction of bridges should be examined before private construction is authorized.

Standard Signs for Roads

By agreement the highway officials of the several States and the Federal Government have adopted as a standard certain designs for danger and direction signs proposed by a committee of engineers appointed by the Secretary of Agriculture at the suggestion of the American Association of State highway officials. The standard designs are intended for erection on all routes of the United States highway system, which mainly comprises the more important sections of the Federal-aid system. Erection of like signs for similar purposes in all States traversed by the principal interstate routes would promote the safety and convenience of travelers.

In States where these signs have been erected official observation and the praise of travelers indicate that the expected benefits accrue. In several States, however, the plan has not been put into effect. Early action by these States would much increase the value of the improvement, half the cost of which may be paid by the Federal Government.

Planting of Shade Trees

Provision is made for the planting of shade trees in a recent amendment of the Federal highway act. At the request of the State highway departments, Federal funds will be allotted to pay half the cost of suitable plantings. This department will cooperate with State authorities in the selection of suitable varieties and in the planning and arrangement of plantings. Several States have proceeded independently in the planting of shade trees on highways and have effected great improvements at a relatively small cost. As yet, however, no State has called upon the department for financial assistance in such work.

Arthur M. Hyde,
Secretary of Agriculture.

FINANCIAL STATEMENT

Expenditures, Department of Agriculture, Fiscal Year 1929

Funds expended and obligated for work under the supervision of the Department of Agriculture conducted during the fiscal year which ended June 30, 1929, including road building, totaled $172,898,690. These expenditures were distributed by organization units as follows:

TABLE 1.—*Expenditures classified by organization units*[1]

Organization unit	General activities (all objects except payments to States and road construction)	Payments to States (exclusive of Federal-aid road funds)	Road construction (including Federal-aid roads)	Total
Office of the Secretary	$1, 176, 714			$1, 176, 714
Office of Information	1, 136, 893			1, 136, 893
Library	95, 675			95, 675
Office of Experiment Stations	397, 511	$3, 840, 000		4, 237, 511
Extension Service	1, 960, 751	7, 162, 936		9, 123, 687
Weather Bureau	2, 956, 269			2, 956, 269
Bureau of Animal Industry	[2] 14, 349, 539			14, 349, 539
Bureau of Dairy Industry	611, 458			611, 458
Bureau of Plant Industry	4, 620, 811			4, 620, 811
Forest Service	11, 648, 227	2, 610, 414	$11, 154, 207	25, 412, 848
Bureau of Chemistry and Soils	1, 403, 007			1, 403, 007
Bureau of Entomology	2, 049, 558			2, 049, 558
Bureau of Biological Survey	1, 383, 942			1, 383, 942
Bureau of Public Roads	[3] 826, 939	(4)	85, 685, 774	86, 512, 713
Bureau of Agricultural Economics	6, 074, 718			6, 074, 718
Bureau of Home Economics	147, 554			147, 554
Plant Quarantine and Control Administration	[5] 4, 312, 308			4, 312, 308
Grain Futures Administration	131, 359			131, 359
Food, Drug, and Insecticide Administration	1, 545, 134			1, 545, 134
Seed Loan Office	[6] 5, 616, 992			5, 616, 992
Total	62, 445, 359	[7] 13, 613, 350	[7] 96, 839, 981	172, 898, 690

[1] Expenditures in reports for previous years under the classifications "Regular work," "Special conservation," "Colleges and stations," "Forest Service receipt funds," and "Road construction" are consolidated under the three heads indicated. Expenditures heretofore shown under "Special conservation" for forest taxation and timber insurance studies and for the acquisition of forest lands and lands for the Upper Mississippi River Wild-Life Refuge; all items under "Forest Service receipt funds" except those for road and trail construction and payments to States and Territories, and expenditures under "Road construction" for highway research are included under the head "General activities." The items for "Cooperative fire protection" (exclusive of forest taxation and timber insurance research) and for "Cooperative distribution of forest planting stock," heretofore classified under the head of "Special conservation," the two items heretofore included under "Colleges and stations," and the item for payments to States and Territories under "Forest Service receipt funds" are shown under the head "Payments to States." All expenditures heretofore classified under "Road construction," including those under the Federal-aid road act and supplemental acts (exclusive of amount for highway research) and the Mount Vernon Memorial Highway, and, in addition, the items under "Forest Service receipt funds" for road and trail construction, special road work in flood-devastated areas, and forest road and trail work paid from the general appropriations of the Forest Service, are included under the "Road construction" group.

[2] Includes $3,946,130 paid as Federal indemnities to livestock owners for animals destroyed in connection with tuberculosis eradication, and $5,623,661 for meat inspection.

[3] Includes $314,079 for highway research, paid from appropriation for Federal-aid road construction.

[4] $83,692,540, paid to State highway departments for Federal-aid road work, included under column "Road construction."

[5] Includes $1,268,000 for control of Mediterranean fruit fly.

[6] Includes $5,605,221 for seed and fertilizer loans to farmers in storm and flood stricken areas of Southeastern States, and $11,771 for collection of seed loans.

[7] See Analysis of Payments to States and Road Expenditures.

Analysis of Payments to States and Road Expenditures

An analysis of the figures included in Table 1 as payments to States and expenditures for road construction is given below. It will be noted that the item for Federal-aid road construction appears not only under "Road construction" but also under "Payments to States." It properly belongs in both groups and is repeated in this way so that the total for each group, when taken separately, may be obtained.

(1) *Payments to States*

Office of Experiment Stations:	
Payments to State agricultural experiment stations for research under Hatch, Adams, and Purnell Acts	$3, 840, 000
Extension Service:	
Payments to State agricultural colleges for extension work under Smith-Lever, Capper-Ketcham, and supplemental acts	7, 162, 936
Forest Service:	
Payments to States under Clarke-McNary Act—	
(*a*) Cooperative protection of State and private timberlands against fire (exclusive of $59,933 for forest taxation and timber insurance studies, shown under "General activities")	1, 148, 091
(*b*) Cooperative distribution of forest planting stock	75, 188
Payments to States and Territories from national-forest receipts for benefit of county roads and schools	1, 387, 135
Bureau of Public Roads:	
Payments to State highway departments for road construction under Federal-aid road act and supplemental acts (exclusive of $314,079 for highway research, shown under "General activities")	83, 692, 540
Total payments to States	97, 305, 890

(2) *Road construction*

(*a*) Under Federal-aid road act and supplemental acts:	
Forest Service—	
Construction of forest roads and trails	9, 080, 510
Bureau of Public Roads—	
Payments to State highway departments for Federal-aid road construction (including $1,595,161 for administrative expenses but exclusive of $314,079 for highway research, the latter being shown under "General activities")	83, 692, 540
Total, Federal-aid road act (exclusive of highway research)	92, 773, 050
(*b*) Under Forest Service appropriations:	
Construction of roads and trails, under "General expenses" fund	492, 094
Construction of roads and trails for States (national-forest receipts fund)	419, 179
Construction of roads and trails, under "Cooperative work" fund (contributions from private cooperators)	1, 162, 424
(*c*) Under special appropriations administered by Bureau of Public Roads:	
Mount Vernon Memorial Highway	76, 109
Restoration of roads and bridges damaged by floods in Vermont New Hampshire, and Kentucky	1, 917, 125
Total, road construction	96, 839, 981

Expenditures by Types of Activity

The total expenditure of $172,898,690 for the fiscal year 1929, covering all work conducted or administered by the Department of Agriculture, was classified by types of activity approximately as shown in Table 2.

TABLE 2.—*Expenditures classified by types of activity*

Types of activity [1]	General activities (all objects except payments to States and road construction) [2]		Payments to States (exclusive of Federal-aid road funds)	Road construction (including Federal-aid roads)	Total	
	Amount	Per cent			Amount	Per cent
Research	[2] $13,969,275	[3] 22.4	[4] $3,840,000		$17,809,275	10.3
Extension	[2] 2,727,513	4.4	[5] 7,162,936		9,890,449	5.7
Eradication or control	[6] 12,267,299	19.7			12,267,299	7.1
Service activities	[2] 22,526,702	36.0	[7] 2,610,414		25,137,116	14.6
Regulatory work	10,954,570	17.5			10,954,570	6.3
Road construction			([8])	[9] $96,839,981	96,839,981	56.0
Total	62,445,359	100.0	[9] 13,613,350	96,839,981	[10] 172,898,690	100.0
Percentage of grand total	36.1		7.9	56.0	100.0	

[1] The work of the Department of Agriculture may be divided into six general classifications, as follows:

(*a*) Research: Investigations and experiments in animal and plant production, breeding, and improvement, in methods of controlling diseases, insects, and other animal and plant pests, of soil and fertilizer problems, farm management practice, marketing, and crop utilization, and other scientific studies and investigations of the fundamental problems of agriculture, horticulture, forestry, home economics, meteorology, road building, etc., by means of laboratory and field experiments.

(*b*) Extension work: Demonstration and educational work by means of county agricultural, home demonstration, and boys' and girls' club agents and through exhibits, motion pictures, or otherwise, with a view to the dissemination, by direct contact, of the information developed by the experiments and discoveries of the department and the various States.

(*c*) Eradication or control: Direct control or eradication of plant and animal diseases, insects, and other pests, through organized campaigns, either independently or in cooperation with State agencies.

(*d*) Service activities: Includes such activities as the administration and protection of the national forests, the weather service, market news and inspection services, crop estimating, seed loans, and other work of like character for the benefit of the public, not primarily involving research, extension, or the enforcement of regulatory laws and exclusive of road construction.

(*e*) Regulatory work: Administration of regulatory laws, including the food and drugs act, meat-inspection law, plant and animal quarantine laws, migratory-bird treaty act, cotton futures and cotton standards acts, grain standard act, warehouse act, and others.

(*f*) Road construction: Includes construction of the Federal-aid highway system and forest roads and trails under the Federal-aid road act and supplemental acts, the Mount Vernon Memorial Highway, special road work in flood-devasted areas, and forest road and trail work paid for from the general appropriations of the Forest Service, from national-forest receipts, and from funds contributed by Forest Service cooperators.

[2] The "General activities" column includes, in addition to expenditures reported in previous years under the designation "Regular work," the following items listed in past years under the special classifications mentioned below:

Research: $455,969 for (1) forest taxation and timber insurance studies, heretofore shown under "Special conservation"; (2) forest investigative work, under "Forest Service receipt funds"; and (3) highway research, under "Federal-aid road construction."

Extension: $53,481 for cooperation with States in farm forestry extension work under the Clarke-McNary Act, formerly shown under "Special conservation."

Service activities: $1 726,166 for (1) acquisition of forest lands and lands for the Upper Mississippi River Wild-Life Refuge, shown formerly under "Special conservation"; for (2) improvement, fire protection, brush disposal, and other forestry work defrayed from funds provided by Forest Service cooperators; and for (3) refunds of deposits made by users of national-forest resources, under "Forest Service receipt funds."

[3] 8.1 per cent of grand total.

[4] Payments to State agricultural experiment stations under Hatch, Adams, and Purnell Acts.

[5] Payments to State agricultural colleges under Smith-Lever, Capper-Ketcham, and supplemental acts.

[6] Including $3,946,130 paid to livestock owners as Federal indemnities for animals destroyed in connection with tuberculosis eradication, and $1.268,000 for control of the Mediterranean fruit fly.

[7] $1,148,091 for cooperation with States in forest-fire protection, and $75,188 for cooperation with States in distribution of forest planting stock, under Clarke-McNary Act; and $1,387,135 for payments to States and Territories from national-forest receipts funds for benefit of county roads and schools.

[8] $83,692,540, paid to State highway departments for Federal-aid roads, included under column "Road construction."

[9] See Analysis of Payments to States and Road Expenditures.

[10] Grand total.

Special Corn-Borer Clean-Up Campaigns of 1927 and 1928

By act of February 23, 1927, an appropriation of $10,000,000 was provided for the purpose of assisting the States infested with the European corn borer in a special clean-up campaign looking to the control of this pest. Complete figures are now available covering expenditures for control operations under this special fund for work conducted during each of the fiscal years 1927 and 1928, as follows:

Fiscal year ended June 30, 1927	$3,867,837
Fiscal year ended June 30, 1928	5,563,317
Total	9,431,154

In addition to the above items, approximately $145,000 of the balance of this $10,000.000 appropriation was used during the fiscal year 1929 for researches on various phases of the corn-borer problem, which amount is included in the total for "General activities" of the department in Tables 1 and 2. Of the remainder of this balance, $250,000 is authorized to be expended for corn-borer research and $50,000 for control operations during the fiscal year 1930, leaving available approximately $125,000 of the $10,000,000 fund for the fiscal year 1931, if reappropriated.

Income from Department's Activities, Fiscal Year 1929

Incident to the department's work during the fiscal year 1929, receipts totaling $9,765,527 were covered into the Treasury and fines were imposed and judgments recovered by the courts amounting to $172,890 in connection with the enforcement by the department of the regulatory laws which devolve upon it for administration and execution, as follows:

(1) *Receipts*

(*a*) Deposited to credit of miscellaneous receipts fund:		
From business on the national forests	$6,299,802	
Contributions from private cooperators, appropriated as a special fund for road and trail construction, fire prevention and suppression, brush disposal, and investigative work on national-forest and privately owned lands	1,831,827	
From other sources	1,037,283	
		$9,168,912
(*b*) Deposited to credit of applicable funds of department:		
Fees collected for classifying cotton, deposited to credit of revolving fund for conducting that work	200,728	
Reimbursement to various department appropriations for expenditures made therefrom	395,887	
		596,615
Total receipts		9,765,527

(2) *Fines*

Fines imposed and judgments recovered by the courts in connection with violations of statutes intrusted to Department of Agriculture for enforcement	172,890
Total income from activities of Department of Agriculture	9,938,417

WHAT'S NEW IN AGRICULTURE

AGE Not a Barrier to Adoption of Improved Methods, Survey Shows

The extension teaching carried on by the United States Department of Agriculture in cooperation with the State agricultural colleges aims to reach the rural people of all ages from the youngest member of a 4–H club to the oldest man or woman actively engaged in farming or in the management of a rural home. Do all of the various age groups make approximately the same use of extension information or do the younger farmers and farm women make changes more readily? This is an important question in the minds of those charged with the administration and supervision of extension work, and to those legislative bodies charged with the responsibility of financing the work. If changes in agricultural and home economics practices are primarily associated with youth, perhaps more emphasis should be placed upon work with young people, and less emphasis upon extension activities with those somewhat advanced in age. A background of experience in farming and home making may be necessary before wide use is made of extension information.

Information is available on the extent to which farmers and farm women on 1,636 nonselected farms in representative sections of Kansas, Michigan, Rhode Island, and Illinois have put into practice the teachings of the extension service and on the ages of these farmers and farm women.

Age of Farmers and Agricultural Practices

Dividing these farmers into eight groups with an age difference of five years each, it is found that of 147 farmers in the youngest group (30 years and less) 76 per cent changed practices due to information made available through the extension system, as compared to 77 per cent of the 175 farmers from 31 to 35 years old, and 77 per cent of the 232 farmers from 36 to 40 years of age. Of the 233 farmers ranging in

ages from 41 to 45, 79 per cent changed practices; of 216 farmers 46 to 50 years old, 72 per cent changed practices; of 190 farmers 51 to 55 years old, 76 per cent changed practices; of 167 farmers 56 to 60 years old, 71 per cent changed practices; and of the 276 farmers 61 years of age and over, 66 per cent changed practices. The percentage using extension information decreases slightly with advancing years, but does not fall below 70 per cent until the sixtieth year has been passed. In spite of any lessened physical activity due to advancing age, it is interesting to note that nearly as high a proportion of the farmers over 50 years of age made use of information derived from the county agent or other representatives of the extension service as of those less than 50 years of age.

Age of Farm Women and Home Economics Practices

While the volume of home economics extension done in the areas studied was somewhat less than the volume of agricultural extension, about the same condition exists in the proportions of women in the different age groups making use of extension information. Of the 235 farm women in the youngest group (30 years and less) 28 per cent changed home economics practices due to information made available through the extension system, as compared to 41 per cent of the 211 farm women from 31 to 35 years of age and 35 per cent of the 251 farm women from 36 to 40 years old. Of the 216 women ranging in ages from 41 to 45, 35 per cent changed practices; of 224 farm women 46 to 50 years old, 28 per cent changed practices; of 136 women 51 to 55 years of age, 27 per cent changed practices; of 150 women 56 to 60 years old, 26 per cent changed practices; and of 144 women 61 years old and over, 17 per cent changed practices. The age groups beginning at 46 and extending to 61 years and over made approximately as much use of information relating to better home economics practices as did the farm women of 30 years and less. However, the very young farm women and the older age groups did not change practices quite as extensively as the age groups from 31 to 45 years.

Learning Not Confined to the Young

These data tend to disprove the old idea that learning is largely associated with youth. Farmers and farm women are desirous of making use of information which will be of assistance in connection with farm and home problems, regardless of their ages. It is probable that a higher proportion of the older men and women own the farms they operate, which might account for some increased interest in better farm and home practices. The younger farmers and farm women have had the advantage of more formal educational training which probably more than offsets the question of condition of land occupancy. Men and women of all ages have learned to drive automobiles and to build or operate radios. It is not a question of age but of desire to do the thing, and it is doubtless this same motive which has led farmers and farm women to employ extension information in solving farm and home problems.

M. C. Wilson,
In Charge Extension Studies,
Office of Cooperative Extension Work.

AGRICULTURE in U. S. Specializing More and Using More Machinery The present tendencies in the agriculture of the United States may be briefly summarized as follows: (1) To reduce the number of farms and the area of land in farms, (2) to use more machinery and less labor where possible, (3) to use more science in production, (4) to specialize in production for market, (5) to continue the westward shift of production, and (6) to produce more foodstuffs and less feedstuffs, and to make other changes in production to meet changes in demand.

The marked postwar decline in the profitableness of agricultural production has driven many farmers to the city, and caused farms to be consolidated or abandoned, reducing the number of farms and the number of acres in cultivation. The number of farms in continental United States declined from 6,448,000 in 1920 to 6,372,000 in 1925; and the land in farms declined from 956,000,000 to 924,000,000 acres. Reports to the Department of Agriculture indicate that farm population declined from 28,980,000 to 27,510,000 between January 1, 1925, and January 1, 1929. It is therefore probable that the census of 1930 will show that the number of farms and the land in farms have continued to decline since 1925.

Increased Investments in Machinery

Relatively high wages, on the one hand, and improvements in machinery and relatively lower prices for machinery, on the other hand, have induced many of the farmers remaining on the farms to invest more heavily in machinery to replace hired labor. Farm wages are now about 174 per cent of pre-war wages, whereas the prices of machinery used on the farm average 162 per cent of pre-war. Development of the use of the gasoline engine and improvements in farm machinery generally have been important factors in the movement to employ more machinery and less labor. The value of machinery on farms in 1924 was more than double that of 1910. Allowing for an increase in the price of machinery, it appears that on the average each farmer in 1925 was using about 40 per cent more machinery than in 1910. The use of machinery has greatly increased since 1925. It is estimated that the number of tractors on farms has increased from 507,000 to about 853,000. The combine, having been adapted to the conditions of harvesting on the Great Plains and farther east, is increasing rapidly. Many other implements and tools have been modified to use with the gasoline engine so that a farmer can do more work with them in fewer hours. These machines have made it possible for the farmer to dispense with many days of hired labor, and it seems probable that the amount of hired labor on the farm had been reduced 25 to 30 per cent by 1925 and further reductions have been made in the past few years.

More Production on Less Land With Less Labor

It is interesting that fewer farmers, with less labor, on fewer acres, continue to increase production. In the four years 1925–1928 agricultural production has averaged about 16 per cent more than in the period 1919–1922. In large measure this increase is to be attributed to better farming. The teachings of the agricultural colleges and experi-

ment stations are bearing fruit. The farmer knows more about his soils and the plants and animals with which he deals. He is in better position to combat pests and apply his labor more efficiently so as to secure larger returns in volume of production per unit of labor or capital employed. He is using more fertilizer. Expenditures for fertilizers in 1924 were more than double those for 1909. Taking into account changes in price, it appears that the volume of fertilizer purchases in 1924 was nearly 60 per cent greater per farm than the quantity purchased in 1909, and doubtless purchases have increased materially since 1924. The farmer is feeding his livestock better rations. This is indicated in part by an increase in feed purchases. Apparently the average farmer bought nearly 70 per cent more feed in 1924 than in 1909. He is learning not only better to feed his land and his livestock but also to select and plant better seed, and to breed and feed better animals.

Another marked tendency is to specialize in production for market, which tendency is accompanied by an effort to improve the quality of the product. The farm orchard, for example, is disappearing. Large areas of carefully planted, well tilled, well pruned, and properly sprayed orchards in locations favorable for fruit production have largely taken the place of the farm orchards scattered throughout the country. Similarly, the production of potatoes has shifted largely from the farm garden or small patch in a field to highly specialized areas where conditions are peculiarly suitable for the production of potatoes. To a considerable extent the farm garden has been superseded by specialized vegetable production. In the cities fresh vegetables are to be had the year around. Beginning with the winter months, supplies come from Mexico, Texas, Florida, and nearby islands. As the season progresses, the supplies come from areas farther north. The growth in specialized production of fresh vegetables for market is typified by the increase in the car-lot shipments of tomatoes, a highly perishable product. Shipments of tomatoes have increased from 18,000 cars in 1920 to over 30,000 in the past two years. The continuation of the rapid growth of large industrial and commercial cities, together with improved transportation facilities, makes fairly certain the continuation of this tendency to specialize in production for market.

Westward Shift in Cotton and Wheat

The westward shift in the production of the great staples, wheat and cotton, continues. The adaptation of the combine for use on the Great Plains has given great impetus to the expansion of wheat production westward on the Great Plains. Cotton production continues to expand westward in Texas and Oklahoma. In the meantime the dairy industry and other types of more intensive production continue their westward march, taking the place of cotton in the Southeastern States and of wheat in the North Central States. Since foreign competition in the production of cotton and wheat is increasing, while the domestic demand for fruits, vegetables, dairy products, and poultry products is also increasing fairly rapidly, there is a tendency for the westward expansion in the production of cotton and wheat to be offset by reductions in the production of the Eastern States.

The outstanding development in crop production of the past few years has been an increase of about 50 per cent in the volume of truck-

crop production. This has been in response not only to a rapid growth in the commercial and industrial population of the country but also to changes in the diet of the masses of the people. The appeals of physicians and students of nutrition to eat more vegetables have had a marked effect upon the demand for fruits and vegetables. Likewise, there has been a great increase in the demand for dairy and poultry products. Among the meats the most important development has been a pronounced increase in the demand for lamb, which has greatly stimulated the production of lambs for market. War conditions stimulated the demand for pork and pork products, but recovery of European production after the war and a great increase in the use of vegetable oils and fats are weakening the demand for hogs, both in foreign countries and in the United States.

The demand for hay and some other feedstuffs has been weakened by a great reduction in the number of horses on account of the increasing use of the gasoline engine. The expansion in dairy and poultry production would tend to increase the demand for corn and oats, but this tendency has been offset to a considerable extent by an increasing use of by-product feedstuffs, such as beet pulp, cottonseed meal, linseed meal, and wheat offals, in the balanced ration for the dairy cow and the hen. Such shifts and changes in demand are continuous, and production, to be profitable, must be planned in view of what the producer and the market require.

O. C. Stine,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

ALFALFA Weevil Spreads in Alfalfa-Growing Sections of the West The first question which arises in connection with an insect pest newly introduced from foreign shores is "How can its spread be prevented?" In the case of the alfalfa weevil, which was first discovered in North America about 1905, the answer has never been found. Although it has taken 20 years for this insect to travel from Salt Lake City, Utah, to eastern Wyoming on the one side and to California and western Oregon on the other, its progress has been unbroken. It spreads with equal facility through cultivated valleys, desert plains, and ranges of mountains. Natural barriers for it do not exist, and all human attempts to check it have proved ineffectual. On the other hand, it profits but little from artificial aids to its progress. Although hundreds of railroad cars and automobiles carry weevils, and some of them go to the remotest parts of the United States, only four colonies are known to have been established at a distance, and three of those colonies have now been absorbed in the natural onward movement of the insect.

Fortunately, man's efforts have been more successful in preventing the destruction of fields already infested. At first by cultivating and dragging the fields and in later years by the application of arsenical sprays and dusts, it has been found possible, at comparatively slight cost, to prevent the insect's ravages, which, indeed, were never quite so serious as they have sometimes been represented. The fields in which the damage done by this weevil is most conspicuous are not always those in which the insect consumes most alfalfa, but are often those in which the stand has already been nearly choked out by grasses and

dandelions. In such fields the weevil destroys a little alfalfa and leaves nothing but weeds, but it gets credit not only for the destruction it causes but also for the condition it discloses. The cases where permanent injury has been done to the field are comparatively rare.

After allowance is made, however, for imperfect cultivation, lack of fertilizer, nonrotation of crops, and uneven irrigation, the effects of which have been mistakenly attributed to the alfalfa weevil, it is still a costly hindrance to alfalfa production in extensive parts of Oregon, Idaho, Nevada, Utah, and Colorado. There are also cases where the attack upon the second growth of alfalfa, together with the owner's attempts to produce growth by excessive watering without first killing the larvae, have caused the stand to be choked out by weeds and permanently depleted. The direct loss caused by the feeding of the larvae, too, while it is in many localities less severe than in the early years of the insect's history in North America, is still sufficient to make spraying and dusting necessary. The intermittent character of the attack in late years, instead of being an unmixed benefit, has in fact made the control of the pest less effective, because the uncertainty has often prevented farmers from making the required preparations.

The present work of the Department of Agriculture upon the alfalfa weevil is directed chiefly toward tracing its spread, adapting the standard control methods to conditions which arise in newly infested regions, and studying the natural conditions which in certain seasons promote its attacks and render control measures necessary.

George I. Reeves,
Senior Entomologist, Bureau of Entomology.

APPLE Industry of Japan Founded on American Varieties Throughout the development of apple growing in all lands the variety factor has figured largely. In nearly every country where apple culture has grown into an established industry, varieties of local or regional origin have been developed which have superseded in varying degrees the introduced varieties with which the industry was initiated. This general trend of development, however, is not inconsistent with the fact that varieties of American origin are more or less extensively planted in various other countries, especially in those in which the industry is relatively new, even though varieties of regional origin are also grown. In Japan a comparatively small but regionally important apple industry has been developed on the basis of American varieties. The native apple in Japan is a small, inedible fruit; consequently, apple culture in that country was initially dependent upon introductions from abroad, as in the case of most other countries, but the manner in which those introductions were made constitutes an interesting bit of pomological history not generally known.

In 1870 the governor of Hokkaido (until about 60 years ago called Yezo or Yesso and still sometimes so designated), the island just north of the mainland of Japan, visited the United States and was so impressed with conditions here that on his return the following year he took with him as one of his chief advisors in the development of that island Horace Capron, then commissioner of the United States Department of Agriculture, who resigned that position in order to accept the invitation to go to Japan.

Soon after his arrival in Japan General Capron was invited to an audience with the Emperor, who gave him a commission to take charge of the "measures for agriculture in Yesso."

In connection with this work, General Capron associated with himself a number of specialists from America, among whom were Louis Boehmer as horticulturist, and Edwin Dun (later to become United States minister to Japan), who went in 1873 to take charge of the agricultural crop and livestock work. In 1877 William P. Brooks,[1] later and for many years thereafter director of the Massachusetts Agricultural Experiment Station, became connected with what was then the Sapporo Agricultural College, now a university, which was started on the advice of General Capron.

At the very beginning of this development in 1871[2] there were imported, probably as trees and plants from a nursery in western New York, 75 varieties of apples, 53 of pears, 25 of cherries, 14 of plums, 30 of grapes, 14 of raspberries, 5 of blackberries, 8 of gooseberries, 10 of currants, and several varieties of apricots and peaches.

American Stock Sent to Japan

All of the plant material, representing a great diversity of crops, was sent to a receiving station located in the suburbs of Tokyo. There the fruits were propagated in extensive nurseries. In 1875 much of the nursery stock was distributed, going largely to farmers in Hokkaido but also to the northeastern provinces of the mainland. According to Mr. Dun,[3] some 2,000,000 fruit trees were thus distributed, many of them, however, going to farmers, as has been the case elsewhere, who had no appreciation of them and to whom they meant little or nothing.

However, in due time apples from the more favorable sections, especially from the region of Aomori in the extreme northern part of the main island, and from Hokkaido, began to appear in the markets in Tokyo and elsewhere. In subsequent years those sections have become the principal apple-producing areas of Japan, the fruit grown consisting entirely of American varieties, most of which, even if not all, were undoubtedly in the collection imported in 1871 from New York. However, only a few of the 75 varieties that composed that collection have persisted.

Apple Production in Japan

According to T. Susa,[4] horticulturist in charge of the Aomori Experiment Station recently established there, who visited this department in 1927 shortly before returning to Japan, after having studied in this country for about two years, the annual production of apples in the Aomori district is about 5,000,000 bushels, while the island of Hokkaido, Chosen, and southern Manchuria produce in relative importance in the order named, about 3,000,000 bushels, making the annual total for all of Japan average about 8,000,000 bushels. The principal varieties and their relative importance are: Ralls (*Ralls Genet*), 50 per cent of the total; Jonathan, 30 per cent;

[1] Letter from Doctor Brooks dated Jan. 23, 1928.
[2] TOHOKU IMPERIAL UNIVERSITY, COLLEGE OF AGRICULTURE. AMERICAN INFLUENCE UPON THE AGRICULTURE OF HOKKAIDO, JAPAN. Sapporo, Japan, 1915, pp. 1–21.
[3] Letter dated Tokyo, July 18, 1928.
[4] Letter dated Aomori, Japan, Dec. 7, 1927.

and the remainder made up mostly of Ben Davis, Smith Cider, Red Astrachan,[5] Oldenburg (*Duchess*),[5] and Summer Pearmain. The latter is a favorite variety and is in season in northern Japan from the middle of August to the first of September. The identity of this variety remained in obscurity for more than 50 years, the name having been lost soon after its introduction. But in the fall of 1924 Prof. Y. Hoshino, of the Hokkaido Imperial University at Sapporo, under whom Mr. Susa studied, when visiting the department orchard at the Arlington Experiment Farm near Washington, D. C., saw the Summer Pearmain growing there and from the striking resemblance of the tree to the one in question in northern Japan, together with such other evidence concerning the fruit as he was able to obtain, he was convinced beyond any doubt that it was that variety. This view was confirmed also by Mr. Susa during his visit later to this department.

In Japan the Ralls is outstanding for its keeping quality. Mr. Dun writing from Tokyo on July 18, 1928, stated that it was still in the market in Tokyo at that time. He also stated that 30 or 40 years ago the Baldwin, Rhode Island Greening, Yellow Newtown, and Winesap were frequently seen there, but that they have disappeared from the markets.

How long these American varieties will maintain their relative importance in the apple industry in Japan is problematic. The temperature conditions in the Aomori district and in Hokkaido are much the same as in New York, and the rainfall is comparable with that in the District of Columbia. Varieties that do well in New York and southward to the Potomac River are likely to prove adapted to the more favorable apple-producing sections in the northern part of Japan and in Hokkaido. On the other hand, the experiment station at Aomori is located in the leading apple district of the country and a well-trained horticulturist is in charge. A very natural ultimate consequence would be the development by breeding of varieties peculiarly suited to the local needs of the industry and to the tastes of the people. Such a development has been going on in our own country for many years.

H. P. Gould,
Senior Pomologist, Bureau of Plant Industry.

ASIATIC Beetles of Three Kinds, Recent Invaders, Are Studied During the summer of 1920 the Asiatic beetle (*Anomala orientalis* Waterhouse) was discovered in a nursery near New Haven, Conn. By 1925 the insect had spread over 27 city blocks, and some damage to sod was apparent. In 1926 the beetle was found near Jericho, Long Island, where it had damaged several acres of turf. About the same time it was found in abundance at Mount Vernon, N. Y., and several other points in Westchester County, N. Y. Since then the Asiatic beetle has been collected at Elizabeth and Rutherford, N. J. The State and city officials, cooperating with the Bureau of Entomology, attempted to eradicate the infestation at New Haven in 1925 and 1926 by treating the turf with carbon-disulphide emulsion. A marked

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[5] These varieties not of American origin but widely grown here for a century and in all probability included in the collection that went to Japan in 1871.

reduction in the number of larvæ was obtained. When the Asiatic beetle was found on Long Island and in Westchester County, the eradication program at New Haven was discontinued and efforts were devoted to a study of the distribution, life history, and habits of the insect, and of means for its control.

Life History and Habits of the Asiatic Beetle

The Asiatic beetle is somewhat smaller than the Japanese beetle (*Popillia japonica* Newman), and varies in color from black to a brownish gray. On many individuals the wing covers are marked by more or less irregular, transverse, brown or black lines. The life history of the Asiatic beetle is similar to that of the Japanese beetle. The adult beetles appear early in July and are present for four or five weeks. Unlike the Japanese beetle, they are not strong fliers; in fact, many of

FIGURE 1.—Small area of lawn left untreated, showing turf entirely destroyed by the grubs of the Asiatic beetle

the adults never fly at all. Under favorable weather conditions some flight occurs, but usually at not more than 2 or 3 feet above the ground. Some feeding by the adults has been observed on the blossoms of roses and hollyhocks. Studies of the insect in Hawaii indicate that in those islands little or no feeding takes place during the adult stage. After mating, the female deposits between 40 and 60 eggs in the soil, in a manner similar to that of the Japanese beetle. Upon hatching, the larvæ feed on the roots of grasses and other shallow-rooted plants. They become full grown by the middle of October and pass the winter in the soil at depths ranging from 6 to 15 inches below the surface. In the spring they approach the surface and feed for about a month or six weeks before transforming into pupæ.

The damage caused by this insect is done almost entirely by the larvæ, or grubs, and the injury to sod is similar to that caused by the larvæ of the Japanese beetle. (Fig. 1.) Asiatic beetle larvæ feed somewhat closer to the surface than Japanese beetle larvæ, and, when they occur more abundantly than 75 or 100 to the square yard, they

may destroy the sod. The natural spread of the insect is relatively slow, as is evidenced by the infestation in New Haven, which has been present for at least eight years, but probably does not extend over more than 3 or 4 square miles, whereas infestation by the Japanese beetle extended over an area of 5,122 square miles in 1924, eight years after its discovery in New Jersey.

The application of lead arsenate to the soil as a means of control for the Japanese beetle led to the use of this insecticide against the Asiatic beetle. Treatments have been applied on most of the estates on Long Island where injury to turf has occurred, and the results have been excellent. The application of lead arsenate, either at the time the lawn is reseeded or as a top-dressing in cases where injury is slight, is a cheap and practical method, and, thus far, has afforded excellent protection to the turf. Detailed instructions for the treatment of lawns are given in another article in the Yearbook entitled "Lawns Protected by Lead Arsenate From Beetle—Grub Injury."

The Asiatic Garden Beetle

In July, 1926, a beetle was sent for identification to the Japanese beetle laboratory by a lady in Mount Vernon, N. Y., who thought it might possibly be the Japanese beetle. Investigation proved that it was identical with an insect which had caused damage in Westchester County, N. Y., in 1922, and in Essex County, N. J., as early as 1921. Owing to the similarity of this to a native species (*Serica parallela* Csy.), the correct identification of the insect had not been made in 1921 and 1922. It was later positively identified as the Asiatic garden beetle (*Aserica castanea* Arrow), an insect heretofore known to occur only on the islands of Japan. During 1926 several reports of damage by this insect in Westchester County and in northern New Jersey were received by Federal and State officials. In 1927, 1928, and 1929 this insect became increasingly abundant, and it is now known to occur in Connecticut, southern New York (Long Island), central New Jersey, eastern Pennsylvania, and the District of Columbia.

The adult insect is a small, brown beetle, not more than one-half inch long, somewhat more slender and less robust than the Japanese beetle. Fine hairs on the wing covers give it a velvety appearance. It is similar to the Japanese and Asiatic beetles in its general life history. The adults emerge late in June and are present until the early part of August. The eggs are deposited during July in clusters of four or five, from one-half inch to 4 inches below the surface of the soil.

The adult beetles fly in the evening, and, to a slight extent, in the early hours of the morning. During the day they remain hidden beneath the grass, or an inch or two below the surface of the soil. They feed almost entirely between 8 and 11 p. m. They are strongly attracted to lights, and have been collected from the outside of window screens and on screen doors when the houses were lighted at night. The young larvæ feed very close to the surface of the soil. They become full grown late in the fall, and pass the winter from 7 to 12 inches under ground. The larvæ do not become active as early in the spring as the larvæ of the Japanese and Asiatic beetles, and it is not until the latter part of April or early May that feeding is resumed. This insect breeds as readily in meadow lands as in well-kept lawns or golf courses, thereby differing from the Asiatic beetle. While severe

injury to turf by larvæ of the Asiatic garden beetle has been observed, this insect is not generally considered to be primarily a pest of turf.

The adult Asiatic garden beetle has been recorded as feeding on more than 50 species of plants. Among the strictly economic plants which it attacks are beans, carrots, peaches, and peppers, as well as pine, hemlock, barberry, rose, yew, aster, lilac, and dahlia. The adult of this beetle differs from the adult of the Japanese beetle in the manner of feeding, in that it eats the entire leaf, except the main ribs, whereas the Japanese beetle eats out only the softer portions of the plant tissues between the veins. (Fig. 2.)

FIGURE 2.—Characteristic injury to peach leaves caused by the Asiatic garden beetle

Experience has shown that treatment with lead arsenate is as effective in destroying the larvæ of the Asiatic garden beetle in the soil as it is in the case of the Japanese and Asiatic beetles. Spraying the food plants with 3 pounds of powdered lead arsenate in 50 gallons of water is effective where the number of insects present is not too great. Trap lights placed over large funnels have also proved effective. (Fig. 3.) In one instance as many as 157,774 adults were captured in one trap during a period of 30 days.

FIGURE 3.—Light trap used in capturing adult Asiatic garden beetles

The Japanese Serica

The Japanese serica (*Serica similis* Lewis) was collected in very small numbers on Long Island during 1927, 1928, and 1929. It closely resembles the Asiatic garden beetle in appearance and habits. It is known to occur in Japan and has been reported as causing some injury to sugar beets in that country. Thus far it appears to

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be sparsely distributed in Nassau and Queens Counties on Long Island, but it is evidently becoming more numerous in that district. The adults appear somewhat earlier in the season than those of the oriental garden beetle and disappear earlier in the summer. Beyond this, little is yet known concerning the life history and habits of this insect.

LOREN B. SMITH,
Principal Entomologist, Bureau of Entomology.

BAMBOOS Valuable for Ornamental Use When Properly Situated Bamboos are true grasses, just as are corn, wheat, oats, and a host of our important crop plants, but they do not belong among such grasses as those that are valued chiefly for their seeds, nor do they take a place among the grasses that are valued for their leaves, the forage and turf-producing plants. Economically they are valued for their timber, which seems more or less of a paradox to the northerners whose grasses are more lowly affairs.

FIGURE 4.—Small grove of bamboo used with other ornamentals

It is not so much in the timber bamboos that our present interest is centered, for the timber bamboos, perhaps, are the least suited for home adornment.

The bamboos are essentially tropical and reach their greatest development and distribution within that zone. In the Orient, however, they extend northward from India, Ceylon, and Java, into China and still farther through the Philippines and Formosa into Japan. For gardens in the United States, particularly those of the South Atlantic, the Gulf Coast, and the Pacific Coast States, we must turn to the northern species for our bamboos, not only because they are hardier, but because they are of a size more in scale with the plants used about the home.

Among them there is a great diversity of size and style, but there are two characteristic habits which need be considered. In general terms, all bamboos may be divided into those that form dense clumps with many canes rising from a crown that slowly increases in diameter from year to year and those that spread freely by underground running rootstocks until thickets or groves are formed. By the wise gardener this latter group must be viewed with suspicion, unless he has a special place to use them, in which he can make allowance for their spreading habit, for, as any gardener knows, the plant that will not stay where it is planted and invades all adjacent territory is a nuisance, no matter how beautiful it may be in itself.

Vary Much in Size

In size the bamboos vary from dwarf, twiggy plants, scarcely larger than some of our native panicums, to strong-growing plants with canes even 100 feet high. The former have low, slightly branched shoots with leaf blades of varying sizes from the slender, grassy *Sasa pumila* to the broad, almost palmlike *Bambusa palmata* or *S. veitchi*, while the latter make strong shoots often 8 to 12 inches in diameter with spreading branches and slender leaves which last several years before falling.

For the gardener who is interested in effects, the bamboos are of great value because their habit of growth is essentially different from that of our native woody plants, with the result that they make a conspicuous and exotic contrast with our own broad-leaved trees and shrubs. There is a quality which, for want of a better word, may be called tropical in their aspect which the gardener can employ with striking effect wherever they are hardy, and as they are evergreen this contrast may be obtained not only with deciduous plants but with conifers and broad-leaved evergreens.

FIGURE 5.—A clump bamboo used in formal planting

Throughout the South the clump bamboos may be used in garden design as accents, in mixed borders to supply the vigorous vertical note that is obtained from Lombardy poplars and red cedars in the North, or they may be paired to mark a vista or a passage way, taking care that they are given adequate room for development and desirable neighbors for contrast. On the other hand, the bamboos that spread by underground stems must be planted in groves if they are tall, as is the timber bamboo, or as ground covers, as is the case with *Sasa pumila* or the larger *S. veitchi*. The peculiar and characteristic beauty of a grove of timber bamboo can not be overestimated, but for it space is required, and often the home owner does not have this. There is nothing more lamentable than the use of this plant where clump bamboos should have been employed, not only because the plants can not thrive and the best effect can not be secured, but because the plants will constitute a perennial nuisance from their suckering.

Running Bamboos Kill Herbaceous Plants

Grounds covered with the dwarf running bamboos are often very beautiful, but here again the gardener must be cautioned, as these spreading species permit few associates and in time actually kill out herbaceous plants which share the space.

In using bamboos the planter should remember that they prefer a deep, moist but not sodden, fertile soil. If this is not provided, the plants never reach their maximum growth, with the result that the shoots are small and the leaf blades show a starved, yellow-green color. The dwarf running bamboos are often useful as ground covers in open woods if these are not too dry, and often show better color and leaf development than in the open. The shade from the trees serves as well as a slight protection from the sun scorching in the winter, along the northern limits of their range of hardiness. He should remember also that the plants must be given several years to become established in a new site and must be given care, especially in watering, until they show that they are established. As to how far north these plants may be used, there is, as yet, little evidence, but one should remember that many which are frozen to the ground and spring up again, though hardy in one sense, never show their full and perfect beauty.

B. T. Galloway,
Principal Pathologist, Bureau of Plant Industry.

BARLEY Scab Effectively Controlled by Rotations and Clean Fall Plowing

Barley has been severely attacked by scab in the central and eastern United States, and these losses always have been associated with fields where cornstalks have been left on the surface of the ground. General epidemics of this disease have occurred through the corn-winter-wheat area in 1890, 1909, 1919, 1928, and again in 1929. In 1928 scab was severe on wheat and barley alike in this area. Because barley acreage had been greatly increased in the Ohio Valley States to replace winter-killed wheat, a serious problem presented itself. Farmers and feeders alike found that scabbed barley was not suitable for feeding pigs and, unlike wheat, the scabbed kernels could not be removed by cleaning. The epidemic of barley scab of 1929 exhibited less general severity, but caused somewhat similar difficulties in feeding the scabbed barley to pigs.

Barley Scab Can Be Controlled

Damage from barley scab has been associated with cornstalks, wheat straw, and similar crop residues left on the surface of the fields or only partly turned under. For example, in 1928 scab infection averaged 17 per cent in 52 barley fields in northern Illinois and southern Wisconsin where barley was sown in disked or poorly plowed cornland with stalks left on the surface of the ground. This resulted in grain that pigs would not eat. In contrast, the infection in 102 fields in this area where corn was removed and the land well plowed was less than 2 per cent, with little damage to the feeding value of the barley.

The scab parasite lives over winter on old cornstalks and other crop residues. When the weather is humid and hot it spreads to the developing barley kernels and causes the scab disease, resulting in lightweight barley of poor quality. The scab infection spreads through the kernel and into adjacent kernels of the head during ripening and even after the grain is cut, if grain is harvested at all green or if protracted rainy weather follows cutting. Fields showing scab infection should be allowed to become fully ripe and dry before cutting in order to prevent spread of the infection in the bundle and shock. Crop rotation, clean fall plowing, and a general clean-up of cornstalks will control barley scab. Up to this time no scab-resistant variety of barley has been found or developed, although several varieties of wheat have been found to be scab resistant, notably selections of Illinois No. 1, Progress, Resaca, and Norka. These results and some progress made with barley indicate that scab-resistant varieties can be produced.

Feeding Scabbed Barley

Probably the best means of disposing of crops of scabbed barley is by feeding them to beef or dairy cattle or to sheep. Feeding experiments by the animal husbandry departments of the Illinois and Wisconsin Agricultural Experiment Stations, as well as general farm experience, have shown that the feeding of badly scabbed barley to beef cattle results in good gains in weight. Satisfactory milk production has been obtained at the Wisconsin station when barley containing 70 per cent of scabbed kernels was fed in grain mixtures containing 70 per cent by weight of this barley. Lambs have made good gains in weight on this same heavily scabbed barley when it was used as the only grain in fattening rations.

The badly scabbed barley was not satisfactory for pig feed. When 60 per cent of badly scabbed barley was used in a dry-lot feeding mixture the pigs vomited when started on the feed and afterwards did not eat enough to maintain their live weight. The percentage of scabbed grain as well as the severity of infection and the stage of kernel development when scab infection occurred all influenced the value of the barley as a feed for pigs. The pigs were very sensitive to mixtures of badly scabbed barley with clean grain. Frequently less than 30 per cent of badly scabbed barley in clean barley, oats, or corn resulted in reduced feed consumption and little or no gain in weight.

Barley a Profitable Small Grain for Feed

In some sections of the United States barley has been found to be the most profitable small grain the livestock farmer can grow for feed. Therefore, the production of clean barley for feed purposes on the farm has an important bearing on farm profits. Proper rotation and fall plowing for barley will insure this feed production on the farm even in areas where the economy of such a practice in the growing of a cash grain crop is questionable. Scabbed barley should be fed to cattle or sheep on the farms rather than sold at a big discount at the elevator. However, it is best to prevent the severe occurrence of scab by following proper cropping practices.

JAMES G. DICKSON,
Agent, Barley-Scab Investigations, Bureau of Plant Industry.

BEE Races Vary in Physical Characters and in Behavior The honeybee (*Apis mellifica* L.) is not native in the United States but was introduced from Europe in the first half of the seventeenth century. In the last three-quarters of a century it has been an object of intensive study and during this time certain varieties or races have become recognized. For the beekeeper in the United States the most important of these are the Italian, *Apis mellifica ligustica;* the Caucasian, *A. mellifica remipes;* the Carniolan, *A. mellifica carnica;* the ordinary black, or Dutch bee, *A. mellifica lehzeni;* the Cyprian, *A. mellifica cypria:* and the German brown, *A. mellifica mellifica.*

Little is known, as the result of any scientific work, as to the biological differences of these races, and it would even be hard for the ordinary observer, on first glance at least, to distinguish between them by the eye except on the basis of color, and, in the case of the Cyprian, on size. The Italian and the Cyprian are readily distinguished from the other races by having yellow or russet-orange bands on the first three or more abdominal segments. The Cyprian has often been described as being a light-colored bee, but the yellow coloring of the first two abdominal segments, at least, approaches a russet orange. The Cyprian worker bee, regardless of color, is readily distinguished from the Italian by its smaller size. In the United States a "golden" Italian has been developed, an Italian bee with a pronounced area of yellow coloration on at least five abdominal segments. It should be noted that certain bees from the Caucasus show yellow on the first two or three abdominal segments, but these are to be distinguished from the typical gray Causasians.

The typical gray Caucasian, Carniolan, Dutch, and German brown bees are known as "dark bees," because their general appearance is dark brown or black, or both. In the case of the Carniolan and Caucasian, however, the abdominal segments are marked by a band of gray or grayish-yellow hairs. In the newly emerged Carniolan bee this gives a zebralike effect. It might prove a little difficult to distinguish visually between young Carniolans and young Caucasians. Newly emerged German brown bees also have bands of grayish or grayish-yellow hairs on the abdomen but the bands are narrower and the hairs are less dense. In addition the segments may present a slightly sooty appearance to the naked eye. There seems little difference, on casual observation at least, between Dutch and German brown bees.

Tongue Length Varies

Recently intensive biometric studies of the honeybee have been undertaken, more especially in Russia, to determine differences between various races and strains. It has been found in Russia, a country in which there has been relatively little interregional shipment up to the present, that the tongue length decreases from south to north, in other words, from regions with less intense to those of more intense honey flows. Furthermore, according to measurements in Russia and in the United States, the Caucasian bee has the longest tongue, while the Cyprian comes next. After this comes the Italian.

The question of tongue length is now to the fore in various parts of the world in connection with the need of pollinizers for red clover. The corolla tubes of red clover are considered too long for the shorter tongued honeybees to gather nectar from them. Hence the visits of

all but the longest tongued bees are greatly reduced. The honeybee most common throughout the United States, the Italian, is not the longest tongued bee. The ordinary black or Dutch bee, common in certain localities, is also short tongued.

A few biological differences have been noted as the results of observations in commercial apiaries. One of these has to do with rearing brood in season and out of season. It is often stated that some one race restricts its brood rearing quicker in time of dearth or famine than any other race. Studies in the bee culture laboratory of the Bureau of Entomology at Somerset, Md., on the Carniolan, Italian, and Cyprian races, indicate that there all three give the same relative response to seasonal honey flows and pollen yields. (Fig. 6.)

FIGURE 6.—A few of the nuclei used in queen rearing at the bee culture laboratory of the Bureau of Entomology, where a study of races is being made

Cyprian Bee the Least Gentle

The Cyprian, in the writer's experience, is the least gentle, followed by the Dutch and German brown. The Caucasian is reputed to be the most gentle, and the Carniolan a little more gentle than the Italian. The response of the Cyprians to smoke is well described by Dadant, who likens it to the sound of "meat in the frying-pan." When Cyprians are aroused they seem unsatisfied until they have accomplished their purpose, stinging. Once on the beekeeper, they will cling to him even in a dark building until their purpose is accomplished. Although active workers, their bad temper seems to preclude their use in commercial apiaries where quick movements must be made. Another disadvantage of the Cyprian bee, for comb-honey production at least, is the fact that cappings of their honey leave little or no air space between honey and capping, thus keeping the latter from having a white appearance. The Italian is not such an offender in this respect, while the black races cap their honey white.

In this country the Italian bee has the reputation for keeping its hive cleaner and for fighting European foul brood better than the darker races. It also, in the writer's experience, puts up a better fight against the wax moth than do the Carniolan, German brown, or Dutch races. The Cyprian also fights the moth, as well as robber bees. The Caucasian is said to defend its hive well. One disadvantage of the Caucasian, however, is its abundant use of propolis or "bee glue." At times it will even greatly restrict the opening of the hive with propolis. A fault of the German brown and Dutch bees is their tendency to "run" off the frame during manipulations. One biological characteristic which is said to distinguish the German brown from the Dutch bee is the pronounced tendency of the Dutch bee to swarm.

On the whole, until more scientific data on the biological and physical differences of various races are available, the Italian bee seems to satisfy most of the needs of the American beekeeper. The common black bees of this country, the descendants of the first bees imported, appear to be of Dutch stock. The Italian and the other races were not imported into this country until over two centuries later.

W. J. Nolan,
Apiculturist, Bureau of Entomology.

BEEKEEPING Studies in Intermountain States Show Cost Variations Years of low prices or of low yields of honey may not greatly affect the welfare of the smaller beekeeper who combines honey producing with some other work which enables him to use profitably such time as he need not devote to the bees, but for the specialized beekeeper, who usually has no source of income except his bees, low prices or low yields mean reduced income.

The lower honey prices in recent years have stimulated the development of cooperative selling agencies, and these give much promise of bettering the situation of the honey producer. Many honey producers have developed local markets, which seem to be a ready means of increasing profits. Other producers are considering methods of reducing production costs as one means of increasing net returns from their apiaries.

Recent work done by the bee culture laboratory of the Bureau of Entomology in cooperation with the Bureau of Agricultural Economics indicates the possibilities of reducing the cost of producing honey through improvement in apiary management. These studies were begun in the Intermountain States, with the bee-culture field station at Laramie, Wyo., as a base, and will be undertaken next in the white-clover region (the North Central and Lake States), which is another large honey-producing region; they will be continued until full data have been obtained under various typical conditions. This work is done by securing the cooperation of representative honey producers using good methods. They keep daily labor records, expense accounts, etc., giving a complete record of their costs of production. These records are studied in connection with the methods of management used in individual businesses, and the records are compared.

Profit Linked With Size of Business

While efforts to reduce the cost of producing honey should lead to greater profits, it must be remembered that the lowest possible cost per pound does not necessarily result in the greatest profit for the operator. Profit is also linked with the size of the business and the total production of honey. Assuming that the large operator sells his honey for the same price per pound as the one with a small business, the large producer could permit higher costs and still have a larger income. For example, an efficient small producer having a cost of 4 cents per pound for 30,000 pounds of honey selling at 7 cents a pound would have a return of $900 net, whereas a producer of 120,000 pounds having a cost of 5 cents per pound, and selling at the same price, would have $2,400 net return. Income may sometimes be increased

through larger operations even though the same degree of care can not be given to the larger business. On the other hand, there seem to be situations where it would be well for the small producer to keep his costs low and devote his spare time to some other work which might yield him a good profit in years when the honey flow gave him little or no income.

Those who kept records in the Intermountain States obtained yields of extracted honey ranging from 30 to over 200 pounds per colony. The yields of comb honey ranged from 1 to 7 cases per colony, with only four operators securing more than 3 cases per colony.

It should be emphasized that comb honey ought to be produced only in regions particularly adapted to the production of fine comb honey; that is, regions where there is a regular, abundant, and rapid flow of white honey and where there is a minimum of off-color honey and of propolis. In all other regions it is more profitable to produce extracted honey unless a local market can be developed for the dark comb honey. In many cases this can be done, as a local dark honey is often salable in the locality where it is produced, and may even be preferred to a white honey from some other region.

FIGURE 7. A form of winter case made of galvanized iron and holding twelve 2-story colonies, which is used in some sections of the Intermountain States in preference to cellar wintering

It has been shown that, with not more than 250 colonies, a man may have time to carry on outside enterprises. Except for brief periods in summer, some other occupation not too exacting in its demand for labor at a particular time could be carried on along with the care of 250 colonies of bees. Efforts will be made to determine what other work will most profitably fill up such time as the beekeeper may have to spare. With 500 to 600 colonies of bees, the time of one man was used for most of the year, with additional labor throughout the summer. A few apiary systems of this size were cared for by one man, but this requires excellent organization of the business so that as much work as possible can be done during the winter, leaving only the actual handling of the bees to be done during the busy summer season.

On the more than 25,000 colonies of bees under consideration, the total cost of handling bees throughout the season ranged from $12.50 per colony down to $2.04 among the different operators. At 50 cents an hour, the highest labor cost was $4.47 per colony and the lowest $1.09, while charges other than labor ranged from $9.65 to $0.47 a colony. The investment in bees and equipment ranged from $12 to $45 per colony. Future studies should indicate the significant factors responsible for such variations in costs.

Average Net Incomes of Operators

The average net income for all operators was about $3,000, with their apiaries ranging in size from 160 to 1,800 colonies, some of the

largest net incomes being in excess of $16,000. The average number of colonies in an apiary business was about 650, making the net income per colony average about $4.65. These figures include labor of operator at 50 cents per hour and interest at 6 per cent on the investment, and are based on a price of 6¾ cents a pound for honey and 27 cents for beeswax.

Returns for labor and management for each hour of labor performed by the operator, after allowing 6 per cent interest on the investment, ranged from a profit of $11.78 down to a loss of $1.61 per hour. The net income per colony ran as high as $16, though 4 operators out of 39 showed a loss on the operations of the season.

Where yields of 90 pounds or more of honey per colony were obtained, the results were generally favorable, while for yields of less than 60 pounds the returns were likely to be unfavorable.

The costs for producing extracted honey averaged 7 cents per pound for all apiaries with less than 400 colonies; 7.4 cents for all apiaries having 400 to 800 colonies; 7.2 cents for apiaries having 800 to 1,200 colonies; and 5.4 cents for apiaries with more than 1,200 colonies. This would seem to indicate that the larger apiaries could be managed more economically than the smaller units. This is not necessarily the case; indeed, in several units of less than 400 colonies, the cost was lower than the 5.4 cents per pound of the units of over 1,200 colonies. The facts seem to be that few beekeepers, unless they are able to keep their costs low, ever increase their apiary holdings to any great extent—the large operators, with few exceptions, being very capable honey producers.

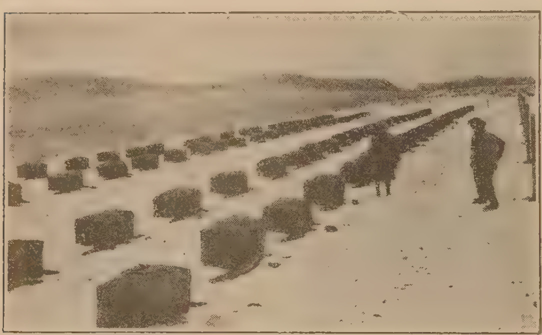

FIGURE 8.—Straw and tar-paper packing as used for wintering protection of bees in some sections of the Intermountain States

For individual producers, the cost per pound ranged from 2 to 22 cents. Good yields of honey are most often accompanied by low costs, whereas low yields are usually accompanied by high costs, though other factors than yield must, of course, be considered. Some producers with low yields of honey have unusually low costs because of economical use of labor, supplies, or equipment. Others with good yields have high costs.

Faults of Management

Low yields, though usually due to seasonal conditions over which the operator has no control, were sometimes due to faults in management, among which disease and poor wintering were common causes. (Figs. 7 and 8.) Winter losses of bees appeared to be due, in some cases, to poor preparation for winter, including quality of bees and quality of stores, resulting in great loss of bees after flying began in the spring. Apiaries were visited in which, owing to these causes, egg laying had ceased, brood was being dragged from the hives, and some colonies had died. Many other causes tend to lessen the yield of honey.

The records of this work for only one season are necessarily so incomplete that it is often impossible to determine what percentage of the favorable results was due to management and what percentage was due to seasonal variations. Recommendations, therefore, of specific methods of management, of size and arrangement of honey houses, and of kind and amount of equipment will not be given at this time. After further records have been secured, it is planned to recommend, for apiaries of various sizes, a system of management and a minimum of equipment which can be expected to give good results.

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BIBLIOGRAPHIES Give Farmer Short Cut to Practical Information There comes a time to most persons when it is realized that many mistakes could be avoided and much faster progress made in the matter of making a living if one could profit more directly from the experience of others. If this realization comes to a farm woman whose source of money income is confined to poultry raising she begins to wonder whether she is following the most approved practices or whether she could make more money from raising ducks than she now does from chickens; or, if she is already raising ducks, she wonders whether her market outlet for them may not be improved.

Probably the first thing she does is to talk the matter over with her family who, she may find, knows even less about it than she does. Then maybe she goes to the county agent and asks him for advice. Perhaps he has been devoting a large part of his time to improving the quality of the livestock of the neighborhood, so feels the need of brushing up on the poultry question. He tells her that he will look into the matter and let her know what he finds. He does so, and in the course of his investigation finds that a bibliography has been made in the library of the Bureau of Agricultural Economics on the Economic Aspects of the Poultry Industry (Agricultural Economics Bibliography No. 24). This lists the most important writings on the subject, from 1920 to 1927, and gives a short description of the contents of each publication. It has an index, so the material on ducks, geese, capons, turkeys, and other fowls may be quickly found.

This leads the county agent to a farmers' bulletin on duck raising as well as to books and other material on the subject of poultry raising in general. These supply all the information the farm woman needs and enable her to decide whether any of her practices should be changed or whether in her locality chickens are more profitable than ducks. She has the satisfaction of knowing that she has had the advice of specialists and that her action is based on the experience of those who have made a success of both lines of the industry.

When the Farmer Decides to Move

Suppose a farmer has decided to sell his farm in the South and move to New York State for personal reasons. It is of the greatest importance that he should make wise decisions as to the type of farm he buys in the new locality and the kind of farming enterprise he undertakes. He knows that he must be prepared for a short supply of farm

labor, and he would like to know how one crop compares with another as to the number of hours of man and horse labor required for different crops. He has seen a notice of a bibliography issued by the library of the Bureau of Agricultural Economics with the title "Labor Requirements of Farm Products" (Agricultural Economics Bibliography No. 26), so he writes for a copy. He finds in it references to bulletins and other publications that give the hours of labor required for most of the crops produced in New York State, including apples. He has been thinking of an apple farm because, as he has raised peaches in the South, he is accustomed to fruit. So he sends for these bulletins and studies them carefully.

Before making a decision, however, other things must be considered. What part of New York State grows the best apples at the least cost? If this could be decided on the basis of the facts, what about a market? Are enough apples raised in that section to supply the needs of the market adequately or is there a demand for more?

These questions lead him to feel that he must study the economic aspects of the whole industry of apple raising. To his satisfaction he finds that there is also a bibliography covering this subject entitled "Economic Aspects of the Apple Industry" (Agricultural Economics Bibliography No. 19). He sends for a copy and spends much time during the winter months studying the literature to which it leads him, so that when spring comes he knows just what he wants and why, and is ready to go after it with confidence.

A list of the bibliographies that have been issued in the series called "Agricultural Economics Bibliography" may be had upon request. Among timely recent additions to it are Taxation and the Farmer (Agricultural Economics Bibliography No. 25) and Agricultural Relief (Agricultural Economics Bibliography No. 27).

MARY G. LACY,
In Charge, Library, Bureau of Agricultural Economics.

BIG Game Increase in Southwest Forests Calls for Control Measures

The elk herds in the Southwest have been established by plants of stock mostly, if not entirely, from the North Yellowstone herd in northern Wyoming and southern Montana. On the national forests there are four elk herds on open range and one small herd under fence. The largest herd, the Sitgreaves herd, established by a plant of about 60 head in 1914, contains more than 1,000 head, not counting the 1929 calf crop. About 900 head are on the Sitgreaves National Forest, about 60 have drifted to the Coconino National Forest, 25 or 30 to the Tonto, and a few to the Tusayan. The herd is increasing so rapidly that early action for controlling its numbers will probably be necessary to prevent the elk from overcrowding the range, spreading to ranch and settlement areas, damaging crops, and becoming a nuisance.

An elk herd on the Santa Fe National Forest near the waters of the Pecos River has increased from about 18 head, planted in 1915, to 200 head, not including the 1929 increase. During the last three or four years the increase has been rapid and the herd is extending the territory over which it grazes. Its number will probably need to be kept at 600 head or less to prevent overstocking of the range and winter migra-

tion to settlements and farms. During February, 1927, 23 head were planted in the Blue Range country on the Apache National Forest and are reported to be doing well there. The small herd that is kept under fence is on the G O S cattle range of the Gila National Forest. About 25 elk were introduced there in 1926 and the herd had increased to more than 40 head by the fall of 1928.

In February of 1927, the Arizona game department shipped in two carloads of elk. One carload was placed on the Hualapai Mountains near Kingman, Ariz., remote from any national forest. The elk in the other car were released between the two divisions of the Tusayan National Forest, and it is thought that about 25 head of these are now grazing on the Tusayan and Coconino National Forests.

Antelope Represented in 11 Southwest Forests

Although the antelope is an easy prey to hunters, it was never exterminated in the Southwest and at present is represented on 11 of our 14 national forests in the region. Some of the herds graze on and off the forests and several bands graze entirely outside national-forest boundaries. In 1926 it was reported that there were about 3,000 antelope in New Mexico, in about 40 bands. Some of the ranges, such as the Haylake country on the Coconino National Forest in Arizona and the V Cross T range in New Mexico, are thought to be carrying about their full number of antelope, although it is reported that this animal is migrating in a few instances to new areas or at least increasing its immediate range. The antelope seems to have responded to the protection given by closed seasons for a number of years. The records of the Forest Service show that during the 3-year period from 1925 to 1928 antelope on the national forests of the Southwest increased about 36 per cent. It may be that some action will have to be taken to control the numbers on local areas. Some game authorities believe that it would be advisable to reduce the number of bucks in some of the herds, which would effect some control of total numbers.

The Mexican bighorn mountain sheep occurs on a few areas within the desert mountain ranges of southern New Mexico and southern Arizona. In Arizona the Coronado National Forest reports 230 mountain sheep and the Tonto 27. The Lincoln National Forest reports 175 on the Guadalupe Mountains of southeastern New Mexico. Some mountain sheep still exist outside the forests, especially in the Big Hatchet Mountains in southwestern New Mexico, a remnant in the San Andres, and a few head on the Papago Indian Reservation in south-central Arizona. All but one of the mountain-sheep areas are within State game refuges.

Three species of deer are found in the region. The mule deer ranges over at least one-fifth of the area of New Mexico and almost as much of Arizona. The whitetail deer is common throughout both States and often its range overlaps that of the mule deer. In the southern parts of the region, a small deer known as the Arizona whitetail, the Sonoran deer, the Chihuahua deer, and the Rock deer, occurs but not in large numbers.

Mule Deer and Whitetail Deer

It is difficult to determine the numbers of mule deer and whitetail deer. Possibly the censuses on the national forests for the period from 1925 to 1928 indicate the trend. It is believed, however, that some

of the apparent increase, amounting to about 51 per cent in Arizona and 143 per cent in New Mexico, reflects more detailed and more accurate estimates. It is known that the increase in both species has been very rapid on local areas. On the other hand, there are wide expanses of good deer range that are understocked and on which the numbers do not seem to be increasing, or possibly not even holding their own. For example, the mule deer have become very scarce in southern Arizona, whereas on the Gila National Forest in New Mexico the same species has so greatly increased in numbers as seriously to overstock its range. In the Mount Graham and Catalina Mountains of Arizona the whitetail deer has increased beyond the sustained carrying capacity of its range. The causes of the increase include the establishment and maintenance of refuges, the killing of many of the lions and other animals that prey on deer, and better law enforcement, which has reduced the annual kill by man to approximately 6 per cent of the total numbers. This kill is far under the natural increase. On the Gila concentration area, relief is being sought through opening the game refuges, abandoning the killing of lions, and making the area more accessible to hunters by the building of a motorway. Relief is being sought on the Mount Graham and Catalina areas, which have been game refuges for several years, through opening the bulk of them to hunting.

The grizzly and black bear, both now recognized as game animals by the laws of New Mexico and Arizona, have been greatly reduced in numbers. Only 24 grizzly bear are reported on the national forests of the two States. The brown, or cinnamon bear, found throughout the region, is said, by authorities, to be merely a color phase of the black bear. The State game laws protect the bear excepting during a month's open season with a bag limit of one but provide for the destruction of bear that are known to be killers of domestic livestock.

The collared peccary is the only species of wild pig occurring in the United States. It is found in the southern portions of both New Mexico and Arizona. It is not a very valuable game animal although it has been hunted for its meat and also as a trophy. It is known also as the musk hog or the javelina. A few peccaries occur in the extreme southwestern part of New Mexico and a remnant in the sand country east of Carslbad with about 1,500 reported on the Coronado, Crook, and Tonto National Forests of southern Arizona.

Game-Management Plans Necessary

The increase in big game, which is generally rapid in the Southwest, calls for the application of game-management plans not only for the protection and propagation of the animals but also for the control of their numbers. More information is needed as a foundation for such plans. Information is needed particularly about the relation between the grazing of domestic livestock and the grazing of game. The ranges used by the game animals, except the mountain sheep, are generally suitable to and actually used by sheep, cattle, horses, or goats.

Both New Mexico and Arizona have up-to-date game laws, Arizona having adopted new laws at the last session of the legislature. Under the old laws in Arizona, game refuges could be established, changed, or abandoned only by an act of the State legislature. On January 1, 1929, there were 7 State game refuges covering 1,491,000 acres on the national forests in Arizona. These refuges were large and so few in

number as to preclude a desirable distribution over the State. On the other hand, New Mexico with the power in the State game commission of establishing, changing, or abandoning refuges, had on January 1, 1929, 59 refuges on the national forests with a total area of 2,661,600 acres. Since the enactment of the present game code in Arizona, that State is rapidly changing its refuge system. It is believed that the plan being followed in New Mexico of having a large number of refuges of comparatively small size, well distributed, is bringing about the desired increase in game and at the same time is providing better hunting on the areas immediately around the refuges. A refuge system even of this character, however, must be flexible since deer, especially mule deer, are prone to stay on a range even after it is overstocked and food has become scarce. This may mean that in places provision will have to be made for the opening of areas designated as refuges after a period of closure and the creating of new refuges where local protection of the game animals is needed. This would result in a sort of rotation system under which a former refuge opened to hunting would be closed again after a period of years.

D. A. Shoemaker,
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BLACK Stem Rust of Cereals Has More Than 60 Physiologic Forms

The minute fungus, *Puccinia graminis*, that causes black stem rust of small grains and grasses and frequently overwinters on the common barberry, might well be called poker-face Puccinia because one can not tell by looking at it how it will act. What appears to be a single rather ordinary rust fungus actually is a large aggregation of parasitic strains that look alike but behave differently.

Black stem rust attacks wheat, oats, barley, rye, and about 100 grasses, both wild and cultivated. It looks just about the same on all of these plants, but it has certain constant peculiarities of structure and form that always distinguish it from other rusts. Whether stem rust be on wheat, oats, timothy, wild barley, quack grass, or any other grass, it always can be recognized as stem rust. But the rust from wheat can not infect oats, that from oats can not infect wheat, and that from rye can not attack either wheat or oats. The appearance of the rust is essentially the same on all three plants, and it therefore is considered a single botanical species. But the species clearly comprises several different parasitic strains (varieties) that look alike but behave differently on cereals and grasses. These parasitic strains are called varieties, because, besides their differences in parasitism, they differ slightly in appearance under the microscope. For convenience they are given Latin names, but the English equivalents are used in this article.

Six varieties of stem rust are known in the United States. The wheat variety attacks wheat, barley, and many grasses, but rye only weakly and oats not at all. The rye variety attacks rye, barley, and many grasses, but not wheat and oats. The oat variety attacks oats and a large number of grasses, but not wheat, barley, or rye. In addition there is a distinct variety on timothy and certain other grasses, one on redtop and closely related grasses, and one on bluegrass and its relatives. None of the last three infects the cereal grains normally.

Inoculations Disclose the Varieties

These varieties are quite distinct, although some of them may infect the same plants. The wheat variety of stem rust and that on rye both thrive on barley. There is no way of knowing by looking at rusted barley whether the rust belongs to the wheat variety or to the rye variety. But it is easy to tell by making inoculations. This is done by taking from rusted barley some of the brick-red dust, consisting of thousands of the spores or reproductive bodies of the rust fungus, and placing it on wheat and rye plants. Under favorable conditions the results will be apparent in about a week. If the rye variety of rust was present on barley, rust will appear on the inoculated rye but not on the wheat. If the wheat variety was present, the wheat will become rusted but the rye will remain almost free.

By making inoculations on certain cereals and grasses in this way it is possible, therefore, to distinguish just as precisely the different varieties of stem rust as it is to distinguish rye from wheat. The rust varieties have specialized in food habits. What is meat for one may be poison for another. The oat variety of stem rust thrives on even a skinny oat plant, but the wheat variety would starve to death on it, no matter how juicy the oat plant might be. Just why, no one knows. And the specialization does not stop with the varieties. There are still more narrowly specialized parasitic races within some of the varieties themselves.

Varieties Comprise Parasitic Races

The wheat, rye, and oat varieties of stem rust all comprise numerous parasitic races, called physiologic forms, that differ in their ability to attack varieties of wheat, rye, and oats, respectively. There are more than 60 of these physiologic forms of the wheat variety of stem rust alone, more than a dozen within the rye variety, and about half a dozen within the oat variety. These forms are designated by numbers only. Because of the outstanding importance of stem rust of wheat, the forms of this variety have been studied most extensively.

Physiologic forms of wheat stem rust differ from one another in their ability to attack certain varieties of wheats. One form may attack Marquis but not Kanred and Kubanka; another, Kanred and Kubanka but not Marquis; another, Marquis and Kubanka but not Kanred; and yet another may attack all three. More than 60 such forms have been recognized by their parasitic effect on 12 varieties of wheat, einkorn, and emmer. The same wheat variety may be very susceptible to some forms, moderately resistant to others, and immune from still others. This explains why a variety of wheat sometimes is very susceptible to rust in one region and resistant in another in the same year, or susceptible in a locality in one year and resistant in the same locality another year, when conditions are favorable for the development of rust throughout. The fact is that there may be different physiologic forms in different regions in the same year and in the same region in different years.

Annual Surveys of Geographic Distribution

Surveys to determine the geographic distribution of physiologic forms of stem rust of wheat and oats are made each year in order to learn not only what is happening in rust development but also what

is likely to happen. For example, the durum wheats were grown for years in the Dakotas and Minnesota without serious injury from stem rust, even in years when bread wheats were severely rusted. But in 1923, 1925, and 1927 many varieties of durum were badly damaged. What is the explanation? Merely this: In most years those physiologic forms that attack the durums severely are not abundant in the spring-wheat area, but they were abundant in 1923, 1925, and 1927. Most durums are likely to be injured by rust in those years when forms to which they are susceptible are abundant and weather is favorable for rust development. Another example: Kanred, a hard red winter wheat, is immune from some forms of wheat stem rust. Therefore it escapes rust injury sometimes and in some places. But it is completely susceptible to other forms. Therefore it is severely injured by rust sometimes and in some places, as in western Nebraska in 1923. Again, Marquis wheat, very susceptible in the spring-wheat area, seldom rusts heavily in the Gulf States and west of the Rocky Mountains, because of the scarcity of those forms that attack it.

Physiologic-form surveys have been used also to aid in determining the spring sources of rust in northern United States. Does most of the rust come from barberry bushes in the North, or is it blown by winds from the far South, where it persists independently of the barberry? In 1926, form 11 of wheat stem rust predominated in the South but was not found in the spring-wheat area. Hence it seems unlikely that the rust migrated from south to north that year. In 1927, on the other hand, the same forms occurred in the South and North, and it appears that the rust may have migrated northward. In 1928, form 38 predominated in Mexico and southern United States, but this form does not infect normally the hard spring wheats nor the durums and, even if it had migrated northward, it could have done but little damage. At the same time, it was found that the wheat rust near barberries in the North was mostly of forms that were very virulent on spring wheats.

Breeding Rust-Resistant Varieties

These facts are important also in breeding rust-resistant varieties of small grains. So far as is known, no variety of wheat is resistant to all physiologic forms. Therefore hybrids are being made in order to combine in one the resistance to as many physiologic forms as possible. The hybrids should be artificially inoculated with all rust forms that occur in the region for which the new varieties are intended. Otherwise their actual value is not known.

All the physiologic forms within each of these three varieties of stem rust probably have not yet been found. Will new forms appear and complicate still further the problem of rust control? They probably will. It is known that in other parts of the world there are forms of the wheat rust and of the oat rust that are more virulent than those hitherto found in this country. They may be introduced, unless they can be excluded by quarantine. And there is evidence that nature is producing new forms by sudden change—mutation—and by hybridization between forms on the common barberry, where the rust develops in the spring and the sexual fusions occur. The eradication of the common barberry will reduce the danger of new and virulent forms being produced by hybridization, and quarantines may reduce

the danger of importing new forms from abroad. In spite of all human effort, new forms undoubtedly will appear to plague us and menace our crops. And then, as now, full knowledge of the situation will be very helpful.

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Agent,
Stem Rust Investigations, Bureau of Plant Industry.

BLISTER-Rust Control Makes Progress in Protecting White Pine

White-pine blister rust, a fungous disease of foreign origin, is of great economic importance in the eastern United States because it kills the white pine which is one of our most valuable forest trees. White pine is found from Maine to Minnesota and southward to Georgia. It is especially prized because of its rapid growth, excellent timber, high yield, and adaptability to forest management. It also has important scenic and recreational value. During recent years it has been used extensively in the reforestation of waste lands. This species is effectively retaining its high place in forestry largely because of the progress that has been made in the development and general application of practical measures for the control of blister rust.

During the period 1918 to 1921 the United States Department of Agriculture in cooperation with the affected States experimentally developed and demonstrated practical control measures. The problem was simplified by the fact that the disease lives alternately on the white pine and on the leaves of currants and gooseberries. It can not be communicated directly from one pine to another. Therefore it is possible to control the disease locally by the systematic eradication of all currants and gooseberries within infecting distance of white pine. This distance varies with local conditions, but experience in the Eastern States has demonstrated that any white-pine stand can be adequately protected by uprooting all currants and gooseberries within 900 feet of the trees. In addition, the cultivated black currant, on account of its susceptibility to infection and its importance in aiding the long-distance spread of the disease, must be eliminated from white-pine regions. In this experimental work more than 14,000,000 wild currants and gooseberries were eradicated from 1,036,903 acres of land at an average cost of 38 cents per acre, the cost being reduced from an average of 72 cents in 1918 to 18 cents in 1921. Since 1922 the United States Department of Agriculture has cooperated with the 12 Eastern States in which the disease has become established in vigorously prosecuting a joint program to secure the systematic and general application of control measures. Effective educational and service activities with white-pine owners have resulted in willing and generous cooperation in control work.

Control Work in New England and New York

In New England and New York during the period 1922 to 1928, 25,000 individuals and 853 town appropriations made available more than $567,000 for cooperative control work. Also, thousands of individuals have given up growing cultivated currants and goose-

berries to help protect the white pine. As a result of the general application of local control measures, 5,450,075 acres of land have been cleared of about 53,000,000 wild currant and gooseberry bushes at an average per acre cost of 18 cents. If the experimental control work performed prior to 1922 is included, it is apparent that since 1918 control of the rust has been established on 6,486,978 acres of land by the initial eradication of these bushes. This acreage includes the protection zones around pine stands. To maintain control on the protected areas, it will be necessary to rework them after a period of five to seven years to destroy any bushes that were missed or that have grown from seed or broken roots.

Other Control Activities

In conjunction with the protection of the natural pine stands, the cooperating States are taking adequate action to eliminate the cultivated black currants and to safeguard white-pine plantations. These States are also protecting the white pine in their State forests and are securing the application of control measures by nurseries producing white pine to assure the growing and distribution of disease-free planting stock. The white-pine areas in the eastern national forests and parks are likewise being protected by the timely eradication of currant and gooseberry bushes.

In the Lake States, Pennsylvania, and New Jersey the establishment and spread of the disease has been relatively slow. Cooperative blister-rust control activities in these States have included scouting for the disease, eradication of infection centers, and investigational and educational work. During recent years there has been a gradual increase in the amount and distribution of the disease which became especially evident in 1927 and 1928. Consequently, these States are now actively undertaking to secure general and systematic application of control measures to protect their white-pine forests.

E. C. Filler,
Senior Pathologist, Bureau of Plant Industry.

BORON in Irrigation Water May Hurt Citrus and Walnut Orchards In 1926 W. P. Kelley, of the University of California, discovered that a certain type of injury to lemons and walnuts was associated with the occurrence of boron in irrigation water. This type of injury had been known for some years, but the fact that boron caused it was not known. It has long been recognized that rocks and minerals rich in boron are widely distributed in California and Nevada. The waters of several lakes and springs in those States contain salts of boron in solution, often in relatively high concentrations. For many years borax and boric acid have been produced in commercial quantities from mineral deposits and from the brines of salt marshes in the desert regions of that area.

In view of these facts it is not surprising that boron should be found as a normal constituent of the salts occurring in irrigation supplies, and its presence had been reported a number of times. However, there was very little information as to the quantities of boron carried in solution in the stream or well waters used for irrigation, for the

reason that, while it is possible by simple tests to determine the presence of boron in a solution, it requires a careful and somewhat tedious laboratory procedure to determine the quantity present. Prior to the discovery that boron was in some cases an injurious constituent of irrigation waters very few quantitative determinations of it had been made.

Evidences of Boron Injury

While it is probably true that boron as it becomes concentrated in the soil solution may cause injury to a number of different crop plants, the most conspicuous evidences of such injury are shown by citrus and walnut trees. These evidences appear in the leaves. Of the citrus varieties the lemon is probably the most sensitive to boron injury and its symptoms are the most pronounced. These symptoms appear only on the full-grown and more mature leaves, where a yellow color develops along the leaf margin and between the larger veins, and the affected leaves fall from the tree prematurely. With the walnut, which is normally deciduous in California, the symptoms of leaf injury do not appear until mid-August, when the leaves are full grown. The leaf margins then die and turn brown, and beadlike dead spots develop in the tissue between the veins.

It has been found that where such plants as citrus and walnut trees are injured by boron in the soil solution, the boron content of the leaves is much higher than is normal for uninjured trees. This fact makes it possible to assign a chemical cause for the visible symptoms. The boron content of the leaves of normal healthy trees of citrus and walnut in California may range from 50 to 200 parts per million of elemental boron, based on the dry weight of the leaf material. In leaves where definite evidences of boron injury are found the boron content usually ranges from 500 to 1,500 parts per million.

Sources of Boron

Boron is found in injurious concentrations both in the waters of surface streams and in those from deep wells. Where it occurs in stream waters it is usually possible to trace it to its source. Each surface stream has many tributary springs or smaller streams. When these are examined it is found that the waters of most of them contain very little boron. The boron contributed to the main stream usually comes from one or at most a few sources in which its concentration is relatively high, and the quantity of water involved may be very small. It thus becomes possible to diminish the boron content of the main stream by isolating the tributary that yields the major contribution of boron.

Where irrigation water is obtained from wells, it is found that even when several wells tap the same body of underground water there are marked differences in the boron content of the different wells. If boron troubles develop from the use of underground water, it is possible to locate the well or wells that are contributing the high-boron water and either discontinue their use or else use the water on crops that are less sensitive to boron injury.

In most instances the occurrence of boron in springs or wells is associated with hot water and presumably with volcanism. It is not true, however, that all hot waters are contaminated with boron, or that all boron waters are hot. It has not been possible, as yet, to cor-

relate the boron content of waters with other characteristic constituents. In California high-boron waters are usually alkaline in reaction, and it is assumed that the boron is in combination as a borate salt. In view of the uncertainty as to the character of this combination, it is deemed advisable to report analytical results in terms of elemental boron rather than as a borate or as boric acid.

Concentrations of Boron

Boron has been found in all samples of irrigation water that have been analyzed for that element in the present investigation. In the waters of certain mountain streams close to the melting snow the boron content has been as low as 0.05 part per million. There are many irrigation supplies, including the Colorado River, in which the boron content appears to be below the point of ultimate injury to crop plants, ranging from 0.1 to 0.3 part per million. On the other hand, there are a number of wells and surface streams used for irrigation in which the boron content ranges from 0.4 to more than 1 part per million. In a few wells, streams, and springs the waters contain up to 6 and 7 parts per million. In most cases these latter waters are known to be injurious to nearly all crop plants.

From such evidence as is at present available it seems probable that where the concentration of boron in the soil solution is low, that is, not above 1 to 2 parts per million of that solution, it is not injurious to most crop plants and may be beneficial. It is evident that with respect to the upper limits of tolerance, crop plants differ very greatly. Such plants as citrus and walnut trees appear to be injured when the boron content of the soil solution remains long above 5 parts per million. Other plants such as the cereals, alfalfa, and possibly some of the deciduous fruits appear to withstand concentrations of 15 parts per million or possibly more.

It should be emphasized that under the ordinary methods of irrigation the concentration of salts in the soil solution is much higher than in the irrigation water used to replenish the soil solution. A part of the irrigation water is lost from the soil by evaporation, and another part is absorbed by the plant roots. None of the salt brought in by the irrigation water is evaporated, and very little of it is taken in by the plants. Consequently the soil solution is the residue left from evaporation and plant absorption and is much more concentrated than the irrigation water. This is true with respect to boron as well as the other salts. The continued use of an irrigation water containing, for example, 8 parts per million of boron may be expected to result, in a few years, in a boron concentration of 8 to 10 parts per million in the soil solution.

The Safe Limit a Difficult Problem

While it is possible to determine with a fair degree of accuracy the tolerance of a crop plant to the concentration of boron in soil solution, the safe limit for irrigation water is more difficult to decide. If the system of irrigation is such that all the water applied is held by the soil of the root zone and there is no leaching, then the boron content of the soil solution will be increased approximately at the rate at which boron is brought in by the irrigation water. The quantity of boron absorbed by the crop plants or precipitated from solution in the soil is

probably but a small part of that brought in. On the other hand, if the system of irrigation is such that the root zone is leached occasionally, and a part of the soil solution, rich in boron and other salts, is replaced by the more dilute solution of the irrigation water, it may be safe to use water having a higher boron content than otherwise.

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BOYS' and Girls' Club Work Has Influence on Family Relationship

Educators have long since recognized the function of the teacher in directing the learning of his pupils toward certain specific objectives. Changes in knowledge, skill, and attitude with reference to certain objectives continue to be the primary concern of the school.

Recently the problem of improving the health of school children has brought many educators face to face with the fact that the school alone can not greatly improve the children's health unless changes are also made in the health program of many homes. Not only must the school recognize the family unit as an elementary influence to be dealt with in any program of change directed toward the individual child, but all agencies working with youth are forced sooner or later to face this problem.

On the other hand, whatever changes the school, the 4-H club, or other organized youth movement may make in the boys or girls included in it will be reflected in the family situation and lead either to improved relationships or to more tensions within the group.

The following interview with a 19-year-old farm boy illustrates how the family relationship is affected by the tension developed between an older and a younger brother because of the participation of one in 4-H club work. There are many other factors in the family situation than just the club activities of the younger boy that are causal to the total situation, but the interview illustrates how carefully an outside agency must consider not only how its program may affect the individual, but the total of human family relationships of the entire group.

Boy's Problem Told to Interviewer

After spending an evening with the family, the interviewer talked to Henry, the younger son.

"Henry, you have made a good start in the dairy business."

"Yes," the boy replied, "but I would like to buy a place over by K. The owner will take a note for it. My older brother and I don't get along together very well. He says that I feed my stock too much. When I told dad that I thought I would leave this place he said that he was sorry that was the way I felt about it. If I would stay I could have the home place, but mother and brother would be sore (especially as the brother and his wife are now living with the family) and it would not be pleasant living here."

The interviewer asked, "Has your father always been interested in club work?"

"Yes; but my older brother has not been. I work here and I don't get a cent. I take care of my stock, pay for their keep, and dad gets the milk. He owes me $900, which I could get if I wanted to take

stock. He was sick and I had to quit school to work. I had a scholarship to the college short course this winter, but I can't go as I have my stock to care for. I wouldn't ask dad to milk and care for them as he doesn't feed as much as I do. I hate to leave dad, but there isn't anything here for me."

"Why don't you stay until you are 21 and save enough money to make a payment on your place and have a little working capital before you leave?"

"It might be best to wait awhile. I have 14 head of purebred stock of my own and a good team. I guess I ought not to have told you all this."

This ended the interview. The club participation of the boy no doubt changed him greatly in his knowledge and skill in raising dairy stock and in his attitude toward scientific farming. And it also was an important factor in creating family tensions centering principally around the older and younger brother relationship.

Solidarity Between Parents and Children

In contrast to this story, the following statements made by parents illustrate effects of club work on parent-child relations that have tended to produce greater solidarity and more frequent and wholesome relationships.

FIGURE 9. Club girls cooperate in making the home attractive

Mrs. Johnson, mother of six children, four of whom are in club work, said:

> Well, I am sure club work has had some effect on every family. I know it had on ours. It makes the parents take more interest in what their children are doing and help them more. They can't help noticing the work that the children do when they go to the fair with them and help them with their records and their work throughout the year. It, of course, leads to more knowledge on the part of the parents as to what the children are doing and what the work is all about, and at the same time may also take more of the parents' time, and many do not want to give this much time and attention to their children's work.

Mrs. Hoxie, mother of four children, said:

> Yes; we are a club family. All our children have been in as long as they could stay. The boy's work has made him want to take the short course at the college if he can get away, and the oldest girl, who is now a teacher, is also a local club leader. I always helped the children since we had no leader, and they have all learned to make their own clothes and have won some prizes and trips as a result of their work.

Interviews with over a hundred farm families whose children are club members from which these comments are taken show that in 75 per cent of the cases a closer and more wholesome parent-child relationship results from participation in the club program, while in 25 per cent of the cases tension of one kind or another develops.

Club Influences Widely Felt

The study upon which the foregoing statements are based indicates that such organizations as elementary schools, secondary schools, 4-H clubs, boy scouts, and camp fire girls can not change individual members without some effect upon the social relations of the entire family, whether or not such change is intended. Participation of any member of the family unit in a new activity becomes immediately a stimulus about which the immediate attention of the entire family centers and results in a changed relationship between the person who participates in the new activity and the rest of the family. This changed status of the individual either leads to readjustments which makes the family life more pleasant and interesting or produces tension in the group

R. G. Foster,
Senior Agriculturist, Extension Service.

BOYS' and Girls' Clubs Promote Cooperation in Community Affairs One of the outstanding needs of rural life is the development of greater cooperation among farming people in community affairs. The 4-H club program recognizes this need and aims to develop constructive group action and group control. Club leaders strive to focus the attention of their groups on vital issues in home making and agriculture. They arrange for contacts with other organized groups and encourage members to respect the rules laid down by the majority. They make it possible for each member to assume a share of responsibility and to conquer self-interests when necessary for the good of the group. Throughout, club leaders aim to develop constructive ideals with every attempt in organized group effort, especially through club meetings, club programs, public demonstrations, trips to other parts of the State and county, contacts with other organizations, and the attainment of the club goals established by the members themselves. Because good fellowship is essential to group unity, many opportunities for its development are provided in the recreational program of each club.

The attention of club members is continually centered upon community affairs, particularly as they affect the farm and home. They learn to recognize and to meet local needs under varying conditions, and gain valuable experience in citizenship. Loyalty to the group and the desirability of giving up personal desires for the good of the group are increasingly emphasized. It is a common practice for 4-H clubs to elect members as delegates to general extension meetings and other farmers' and young people's meetings, where they report what the clubs have done toward carrying out the community program in the growing of crops, the raising of livestock, the preparation and conservation of food, the making of clothing, or the general beautification of the home. It is a part of their responsibility also to take back to their own club groups reports of these meetings, and of general observations made en route, especially those relating to farm and home life.

Club members engage in many community activities as effectively as do adults. These activities give them a feeling that they are a definite factor in community development. In addition to the activities relating to farming and home making, the general community activities undertaken by clubs as a whole often include landscaping the school grounds, refurnishing the town hall, improving the grounds around the

village railroad station, or raising funds for the needy. By such means young people may be kept in touch with the best in rural life and may develop a keen sense of civic responsibility as well as genuine leadership in making their community a better place in which to live.

A Typical 4–H Club Member

What can be accomplished in community building through 4–H club work is illustrated in the story of John Visny, born of Slovak parents on a Connecticut farm. When John was 15, he attended an open meeting of a 4–H health club and there met the county agent. A year later this boy won the national junior championship in judging dairy cattle. Meanwhile he had become interested in dairying primarily and in better silage corn, certified seed potatoes, farm accounts, home improvement, and a community program. In a comparatively short time, through John's initiative, a young farmers' club was organized and a social center provided. With the help of the State college specialists and the county extension agents, farming methods of the community along the lines in which John was interested, were greatly improved. In addition, John was instrumental in organizing a club in dairying and one in making clothing. He helped to make it possible for the young men of the community to attend a trade school in an adjoining city. There is scarcely a club member in his county who has not felt the influence of John's work. This youth is now doing creditable work at the Connecticut Agricultural College.

FIGURE 10.—Club members laying foundation for drinking fountain at a 4-H club camp

Girls, through their 4–H club work, often play a very important part in community development. Many older club members are organizing and leading clubs of younger girls, arousing renewed interest in home making through their public demonstrations, staging community pageants, reviving participation in community singing, and rendering beautiful what before were unsightly spots in the community.

Club leaders believe that the joy and satisfaction gained by farm boys and girls in later years from watching the vigorous growth of a community in the development of which they have had a part well recompenses them for the effort expended. Because of such participation in its development, these young people of a community often become its most useful citizens. The growing demand for increased club work throughout the United States and the general interest in it throughout the world is evidence that these underlying principles in community cooperation and community building as developed in the club program are recognized and appreciated by those interested in a progressive rural community life.

GERTRUDE L. WARREN,
Club Organization Specialist, Extension Service.

BOYS' and Girls' Clubs Stress Farm, Home, and Community Requirements Boys' and girls' 4-H club work represents the junior phase of the cooperative extension work of the land-grant colleges and the United States Department of Agriculture. Extension work in agriculture and home economics is based on the Smith-Lever Act of 1914 and related Federal and State legislation. An important feature of the Smith-Lever Act is that it provides for farm boys and girls a system of teaching supplementary to that provided by the schools. Junior extension work was established simultaneously with the work for adults. The Capper-Ketcham Act, passed in 1928, provided for further extension work in agriculture and home economics with men, women, boys, and girls.

Since the beginning of boys' and girls' club work, there have been differences in viewpoint as to the aims of the work. Some extension workers have held that the primary aim of club work is to improve practices in agriculture and home economics and that the training of the boys and girls is secondary; while others have contended that the fundamental aim of the various club activities is to develop the boys and girls through action on farm, home, and community problems. The purpose of the Smith-Lever Act is to improve practices on the farm and in the home and to better rural life in general. In keeping with the spirit of the act, the instruction offered boys and girls should truly educate them. Four-H club work aims harmoniously to develop the head, heart, hands, and health. Club work is organized and supported by Federal, State, and county funds and is therefore a part of the public education system of the United States. The club enrollment is approximately 700,000.

A significant thing about club work is that the training is practical. Like the adult extension work, instruction is given through projects, problems, demonstrations, and other means under the supervision of a county extension agent or a club leader. Boys usually have projects in crop or animal production and girls in gardening, poultry, clothing, cooking, and nutrition, or some other phase of home making. Club members keep records of their projects and prepare a report on the completed work. Club members must use initiative in working out their problems. Information from books, bulletins, and other literature is applied to the solution of specific problems.

Student's Interest Required

Best results in teaching are obtained when the student is interested, either because he likes the subject or needs the information. Club membership is voluntary. The boys and girls select their projects and demonstrate the results of their achievements.

Four-H club work is based on local farm, home, and community needs. It recognizes that social, civic, and economic conditions are changing, and it provides training to meet new situations. Rural boys and girls have many problems related to the farm and the home. Four-H club work aids rural youth in working out their difficulties. Club members are taught the skillful use of the hands in everyday tasks. To do something worth while, in the best possible way, is fundamental in club work.

Health conservation is a laudable objective in any educational program. One of the pledges of 4-H club work is, "My health to better

living." Boys and girls are taught simple but important principles of the care of the body. The importance of personal cleanliness is stressed. Club members receive instruction in proper diet and appropriate clothing. Food preparation and conservation, and making clothing constitute a part of the training for girls.

Four-H club activities afford opportunities for cooperation. Club members are taught to have respect for the rights and interests of others and to work for the benefit of the community.

Technical Knowledge Imparted

Another object of the 4-H club program is to develop more efficient producers and consumers. Knowledge and skill in farming and home making, and the application of that knowledge and skill, are stressed. To become an efficient consumer, a knowledge of foods, clothing, home equipment, and culture is essential. Club work aims to develop appreciation of these values. It also teaches boys and girls how to profit from their labor and how to utilize their earnings to the best advantage. Many boys and girls save their earnings from year to year until sufficient funds have accumulated to pay a portion or all of their expenses in high school or college, while others use their funds each year to purchase clothing, enlarge their enterprises, and to improve their home surroundings. Club work is a potent influence in stimulating many boys and girls to remain longer in school.

To understand how to use and enjoy leisure is essential in a well-rounded life. Club boys and girls are taught how to play together as well as how to work together. Games, contests, plays, songs, and picnics constitute a part of each club meeting. At the State club camps, members assemble from all sections of the State for recreation.

Club work teaches that the farm is a good place to enjoy life on a moderate income. It affords farm boys and girls opportunity to find themselves and to learn what farming has to offer when modern methods are used. Participation in club activities is helping many farm boys and girls to become leaders in community, county, and State affairs. The educational value of 4-H club work is obvious. The work should be expanded until it reaches all rural youth. It is probably too early to predict what ultimate effect club work will have on rural people; but there are numerous illustrations to show that it is one of the most effective means of giving rural boys and girls a better opportunity for self expression and for a more contented, happy, and progressive rural life.

E. H. Shinn,
Senior Agriculturist, Extension Service.

BROOMCORN Industry Affected by Changing Technic and Demand Broomcorn producers have been able to gage their planting more closely to requirements through the information furnished by the Government on production, distribution, and consumption, and through this service the general trend of the industry has been more closely followed by growers. This places them in a better position to anticipate and meet various problems in the industry which are coming into existence through changing conditions.

Chief among these changes is the general and persistent trend of the broom trade toward the use of common and medium grade broomcorn with a corresponding decrease in the use of so-called parlor quality. Whether this shifting in the demand is controlled by price or is the result of an actual preference for lower quality is problematical, but the effect on the industry has been far reaching.

From the producers' standpoint, at least, the continued preference for common to medium grade broomcorn has encouraged its increased production, particularly in the Great Plains areas of the Southwest where the climate is usually not favorable to the production of the highest quality. Land is relatively cheap in this area and production expenses are comparatively low. The development of the motor truck, which now permits hauling broomcorn long distances in these districts where railroad transportation has been lacking, is a further inducement to the use of remote semiarid land for broomcorn.

In contrast, the decreased trade demand for high-grade parlor brush, either because of its higher production costs or because lower grades supply present quality demands, has tended to discourage the growing of broomcorn on the more expensive and humid lands further east where more expensive methods for curing high-quality brush are necessary. Should this demand for lower grades of broomcorn continue, it is likely that production of broomcorn, as in the past, will continue to shift to new or cheaper lands and will be abandoned in localities in which other and more stable crops offer equal or more lucrative returns.

Producers Striving to Reduce Costs

All branches of the broomcorn industry are making efforts to lower production costs on both the raw and finished product in order to meet the increased demand for broomcorn of moderate cost. This is particularly true of producers in Colorado and Kansas where binders for harvesting have come into use. To harvest instead of to "pull" the brush by hand lowers the cash costs of harvesting and it is not necessary to rush the preparation of this usually lower type of brush as was the case when a higher quality was demanded. Therefore family labor can be used. The saving of labor cost accomplished by this rather new method of handling broomcorn at harvest will probably encourage larger individual plantings, particularly in sections in which weather conditions permit proper drying of broomcorn in the shock.

Producers are not alone in their efforts to lower broomcorn costs as is indicated in the increased interest in storage at primary points. Interest savings on high freight rates from producing sections to the seaboard, to Canada, Cuba, and other remote manufacturing centers encourage storing of broomcorn at or near points of production until needed. This possible saving to manufacturers has had strong support in the use of bonded warehouses and Federal broomcorn inspection. Although comparatively new in broomcorn marketing, these warehouses provide dependable storage at moderate rates and the brush, when officially graded, is accurately identified with the United States inspection metal-sealed tags, and thus becomes a safe collateral for loans.

Just what effect the rapidly increasing chain-store activities are having on the broomcorn industry is as yet undetermined, but the distribution of broomcorn to the large factories, usually at large manu-

facturing centers that supply this trade, has increased. This fact seems to reflect a concentrated buying power in contrast with the former more widely distributed purchases among smaller concerns throughout the country.

Use of Substitutes Increasing

Of most concern to the broomcorn industry is the increased use of substitutes and imitations. Substitutes for broomcorn, or material to be mixed with it, which have come on the market from time to time, have had little direct market effect on the commercial crop of broomcorn. A recent importation, rice straw, closely resembles broomcorn in appearance but its use is not general. It is not seriously competitive in point of wearing quality, but its relatively low prices invite use in low-grade brooms. Mechanical substitutes for sweeping have undoubtedly made serious inroads in the broomcorn industry.

New or changed uses for broomcorn are limited, but modern schemes in household decoration have created a demand for certain types of brush that can be uniformly dyed in solid colors to meet the special color schemes. Then some factories are now making brooms without the use of "hurl" or the longer lengths of broomcorn. If these brooms are favorably received it will further increase the demand for the shorter lengths of brush.

G. B. Alguire,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

BUILDING Program to House Department Is Now Well Under Way The housing situation of the Department of Agriculture has long been the cause of inconvenience and inefficiency because of the large number (over 40) of the buildings occupied by the department in various parts of the city of Washington. As old activities expanded and new activities developed, provision of additional space became necessary. This need was met by renting buildings here and there in the city of Washington, and, since the close of the war, by utilizing space in the temporary buildings erected for service during the war. This situation is now in the way of definite and notable improvement as a part of provision for public buildings made by congressional enactment. More than 20 years ago two units of a great building for the Department of Agriculture, since then known as the east and west wings, were completed, occupied and almost immediately overcrowded. Construction of the central unit connecting these two wings and intended to house the general administration of the department was delayed, but is now well along toward completion and the building is expected to be ready for occupancy in 1930. The illustration (fig. 11) shows the appearance of the new construction with a part of the west wing to the right. When the entire structure is completed it will present an imposing front of 750 feet from the east end of the east wing to the west end of the west wing.

The central structure shown in the illustration has an impressive entrance lobby and staircase. In the interior finish in the lobby several different kinds of marble are used. The base of the building is of gran-

ite and the superstructure and Corinthian columns of marble. The main 5-story part incloses a court, which is paved on a level three steps below the general level of the ground and is glassed in above the second floor. A small fountain adorns the center of the court. This court will be devoted to decorative purposes, not being intended for offices of any kind. The offices of the Secretary of Agriculture will occupy the second floor front, just behind the columns. The rest of the unit will be occupied by the offices of the Assistant Secretary, the various directors and other administrative officers. A feature of special interest on the front side is the entablature, the long panel resting upon the capitals of the columns. On this entablature are engraved the following inscriptions:

The husbandman that laboreth must be first partaker of the fruits.—Saint Paul.

No other human occupation opens so wide a field for the profitable and agreeable combination of labor with cultivated thought as agriculture.—Lincoln.

With reference either to individual or national welfare agriculture is of primary importance.—Washington.

FIGURE 11.—The new building (center) now joining the hitherto detached wings, which were first occupied in 1908

The total amount authorized for the construction of the central part shown in the illustration is $2,000,000. The design was drawn by Rankin & Kellogg, architects of Philadelphia, and approved by James A. Wetmore, Acting Supervising Architect of the Treasury Department.

Building Will Cover Three Blocks

Another long step toward adequate housing for the department will be taken when construction begins upon a great office and laboratory building south of the above-described structure and connected with it by bridges across the intervening street (B Street SW.). The plan contemplates a building covering, when completed, three city squares. A reproduction of the architect's outline drawing of the proposed building (fig. 12) gives a general conception of the plan. The picture shows, rather inadequately, the new central unit, the west wing, one of the overhead bridges across B Street, and the general arrangement of the 10 long wings making up the office and laboratory building. The central two wings of this building, running north and south, are for imme-

diate construction as soon as the site, an entire city block, is acquired by the Government.

The architecture of this building, while not monumental in character like the Administration Building, is nevertheless dignified and sightly. The space provided by the first unit to be built is not sufficient to permit abandonment of all rented quarters, but will still make it possible to bring in several important bureaus now housed in rented buildings, remote from headquarters, and, incidentally, effect a notable saving in rentals.

As the Government's building program for Washington moves forward, additional construction for the Department of Agriculture will continue the expansible building depicted above toward the east and toward the west until the entire plan covering these city blocks is realized. Then it is expected that all branches of the department will

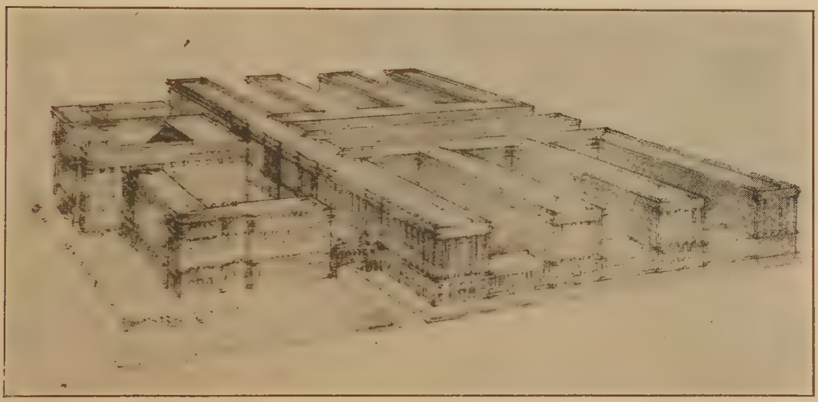

FIGURE 12.—Architect's drawing of the buildings as planned

be adequately and properly housed in one location, and that the drawbacks to efficient administration, now necessary incidents of work conducted in scattered and often unsuitable buildings, will be removed.

W. W. STOCKBERGER,
Director of Personnel and Business Administration.

CANNING Industry's Output Grows Under Food and Drugs Act The consumption of canned fruits and vegetables has grown by leaps and bounds since 1906, when the Federal food and drugs act was passed, and a fair proportion at least of this increased consumption can be traced directly to the operation of the law. For in the years preceding the enactment of the Federal pure food law the consuming public had very little confidence in canned foods. In fact, the old adage "Let the buyer beware" was particularly applicable to such foods.

A large proportion of commercially canned foods in those days was adulterated, misbranded, or improperly prepared. The records show that canned tomatoes frequently contained as much as one-half added water and that peas and beans were often colored with salts of copper, which are injurious to health. Harmful preservatives, such as boric and salicylic acids, were frequently added, and saccharin was some-

times used in place of sugar. Sanitation in the canneries was bad, and the canner's carelessness or ignorance in preparing his goods caused much spoilage.

The better element in the industry at once gave the Federal food officials hearty cooperation. Not only did intelligent canners advocate a stringent enforcement of the food and drugs act, but they supported the movement for scientific research on the part of the Government and of the industry designed to solve the canners' problems, to insure satisfactory canned products, and to educate canners in methods which would result in wholesome and legal products. Most canners were therefore informed rather than reformed. As a result of this cooperation and the continued application of the provisions of the law, canned foods to-day occupy an enviable position in public confidence, as is evident from the annual expenditure of millions of dollars for such foods. Fruit and vegetable canneries now serve as dependable markets to farmers thoughout the United States. To make sure that these markets may be retained and expanded, the Food, Drug, and Insecticide Administration is constantly at work to prevent the small number of dishonest or ignorant manufacturers who have entered this field, along with every other line of business, from cheating consumers and detracting from the good reputation which the canning industry has earned.

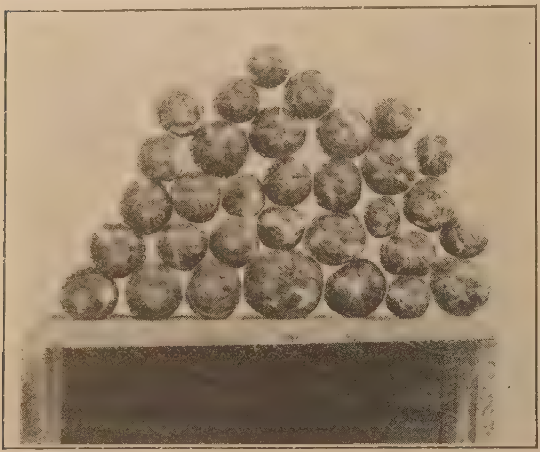

FIGURE 13.—The food and drugs act stopped the use of decomposed tomatoes

Every year the canning plants in the United States are inspected systematically. The inspector going through each cannery follows the raw fruits or vegetables from the time they are received at the plant throughout each canning operation to the finished product. As he goes along he points out any changes in practice which he believes would improve the products being prepared and insists upon changes in operations that would keep the finished products from being in harmony with the requirements of the food and drugs act.

FIGURE 14.—Filthy canneries were common before the food and drugs act was passed

The following excerpt from an inspector's report of a factory inspection of a tomato-catsup factory illustrates the work being done along this line.

An inspector employed by the firm, stationed at a small building at the entrance of the cannery grounds, stops the trucks bringing in the tomatoes, takes three boxes at random from different parts of the load, and dumps the contents into trays for a close examination of each tomato. If the boxes contain any considerable number of green or partially rotten tomatoes the truckman must sort the bad ones from his load. Otherwise it will not be accepted. I watched this operation for an hour. Almost every load delivered consisted practically entirely of firm, red, ripe tomatoes, reasonably free from cracks and blemishes.

This procedure may seem at first to be hard on the farmer, but, as a matter of fact, only a few farmers would deliver unfit tomatoes to a cannery. To protect the interests of those delivering good stock and to insure to the public canned goods of such a quality that they will come back for more, is really a protection to the farmer as well as to the consumer.

The inspector's report continues:

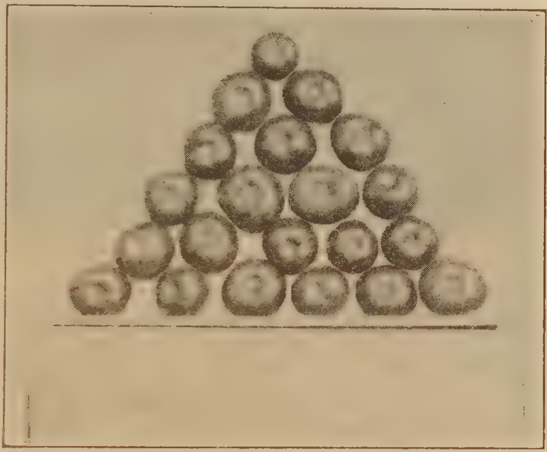

FIGURE 15.—These tomatoes make good catsup

After this preliminary inspection the tomatoes are dumped on a moving belt, where two women remove some of the blemished fruit. The tomatoes continue their journey on this traveling belt to a revolving washer. Here they pass through 14 water sprays, under a pressure of 80 pounds, which insures thorough washing. From the washer the tomatoes pass on to a final sorting belt, where five more women carefully remove any unfit tomatoes that may still remain. As this is the final separation of the good from the bad, I took three bushel baskets of tomatoes that had passed the sorters and examined them carefully. This examination shows the sorting at this plant is very efficient. The raw material going into this firm's catsup compares favorably with what a housewife might use in her own home.

Tomatoes Scalded in Steam Tanks

Next the tomatoes are scalded with steam in large cypress tanks. Then they are pumped through clean glass-lined pipes to the cyclone machines, very similar to the household utensil known as a "ricer," except, of course, on a much larger scale and driven by electricity. In passing through them the tomatoes are first pushed through a coarse-mesh sieve and then through a fine-mesh sieve, when the skins, cores, and seeds are removed. The resulting thin pulp is pumped to the "kitchen," where it is cooked until the desired thickness is obtained. Vinegar, spices, and other flavoring materials are next added. While the mixture is being constantly stirred with wooden paddles it is cooked and concentrated still more. This "finished pulp" is run into porcelain-lined tanks and cooled, and then pumped through a machine very similar to the "cyclone," where the pieces of whole spices are removed. This finishes the process of manufacture. The catsup is then heated to 200° F. and bottled.

Steam and hot water are used to clean this entire system three times daily, first in the morning before canning starts, later before operations are resumed after the noon hour, and finally at the close of the day's operations.

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In addition to the care taken during the process of manufacture to insure a wholesome, clean catsup, laboratory tests are made upon samples taken every hour. This examination is made according to the method developed in the microanalytical laboratory of the Food, Drug, and Insecticide Administration.

Producers of fruits and vegetables for commercial canning may rest assured that this type of supervision, which is extended to all canneries shipping in interstate commerce, has contributed and will continue to

FIGURE 16.—Clean factories are now the rule

contribute toward public confidence in canned foods and toward a resultant larger market for these farm products.

GEORGE P. LARRICK,
Administrative Assistant,
Food, Drug, and Insecticide Administration.

CATTLE Malady Called Anaplasmosis Results from a Blood Parasite

A disease of cattle, known as anaplasmosis, has been found locally in several Southern and Western States. It generally appears during the summer months in malignant form, and the symptoms and postmortem findings indicate that it is infectious. The disease has been confused by some with anthrax and hemorrhagic septicemia. Others have considered it to be a type of forage poisoning. But recent investigations into its nature and cause have shown definitely that the malady is a blood protozoan disease called anaplasmosis.

A study of the blood of sick cattle has revealed signs of very severe anemia with the causative parasites appearing as small globular bodies in the red blood cells near their borders. Sir Arnold Theiler, an eminent authority, who investigated the disease in South African cattle, appropriately named the blood parasite, *Anaplasma marginale.*

Anaplasmosis is prevalent in many parts of the world, notably in south, central, and north Africa, Formosa, Java, Philippine Islands, Transcaucasia, Italy, Argentina, and Brazil. In the United States it has been positively identified in Florida, Louisiana, Texas, Oklahoma, Kansas, Nevada, and California, and it seem probable that some other States also have centers of infection.

Symptoms of the Malady

Generally, the first symptom noticed is a diminution in the milk secretion, but for several days the animal may have a nearly normal appetite. Then there is marked weakness; the gait is stiff and there is a tendency to lie down frequently. At this stage, there is almost complete suppression of the milk flow, with loss of appetite and stopping of rumination. There is a decided costiveness and more rarely a diarrhea with occasionally blood-tinged feces. The urine is normal, never bloody as in Texas fever. The temperature is usually high at the appearance of the first symptoms, ranging from 104° to 107° F., and may remain thus for several days. As the animal becomes weaker and lies down, the temperature falls to about normal and shortly before death may be subnormal. Respiration is very short and rapid, accompanied by expiratory grunting sounds. The pulse is likewise greatly accelerated. There is increased flow of tears and often a drooling of saliva. The visible mucous membranes of the head are very pale and may have a yellowish cast. There is always a marked falling off in weight, the animals having a very gaunt appearance with sunken eyes. In fatal cases death may ensue in from two days to a week or more from the onset of symptoms. The mortality rate may attain 40 per cent of the affected cattle. In cases of recovery, the convalescence is remarkably slow, usually requiring several months before the animal regains its normal condition.

Adequate Control Measures Await Results of Research

The post-mortem findings include an anemic and jaundiced condition of the mucous membranes and other tissues, thin watery state of the blood, numerous small blood spots on the heart sac, the surface of the heart, and the lining membrane of the chest cavity, degeneration of the heart muscle, enlargement and degeneration of the liver, distention of the gall bladder with thick pasty bile and very marked swelling of the spleen.

In other lands where anaplasmosis is prevalent, several different species of ticks have been shown to be capable of transmitting the infection. In the United States, however, experimental work on this phase of the problem has not yet progressed far enough to indicate in just what manner the parasite is propagated outside the animal body and spread to susceptible cattle. Until this work is completed adequate control measures can not be prescribed.

L. T. Giltner,
Senior Veterinarian, Bureau of Animal Industry.

CHEESE Factories in Southern States Are Operating Successfully For many years it was thought that cheese factories could not be operated successfully in the South because of unfavorable climatic conditions. In 1913 a cooperative extension agent of North Carolina investigated the possibilities of cheese manufacture in the southern-mountain districts. He found that as far back as 1892 the making of cheese in the home was an important industry in some of these districts and that many of the farmers still made an inferior quality of cheese. He also found that climatic conditions were very favorable for the production of

good milk and the manufacture of good cheese and that it was the custom when building a farm house to erect it near a spring, which offered excellent facilities for the cooling of milk.

As a result of this investigation, the first cheese factory in the southern mountains opened in North Carolina on June 5, 1915. The building was very small, being 14 by 16 feet in size. The complete cost, including equipment, was $400. (Fig. 17.) During the next 10 years several cooperative factories (fig. 18) were organized in the mountain districts of North Carolina, Tennessee, Georgia, Virginia, West Virginia, and Kentucky. These factories were larger than the first one and cost from $800 to $1,800 each. They were organized to utilize more profitably the surplus milk from beef cattle. This surplus formerly was made into butter and cheese on the farm and netted the farmer in cash only about one-fifth of what the factories paid. Automobile trucks were not being used and the roads at times were impassible. For successful operation, therefore, it was necessary to obtain a sufficient volume of milk within a short distance of the factory. Since this could not be done in sections where only beef cattle were milked, the factories survived only in those communities where there were a few herds of dairy cattle in addition.

FIGURE 17.—First cheese factory in southern mountains (located in North Carolina)

FIGURE 18.—Cooperative cheese factories in southern mountains

No Dairy Cows When Factories Started

Practically no dairy cows were found in these sections at the time the factories started operation. Soon afterwards, however, a few carloads were shipped in from the North. A large number of the purchasers knew little about the care, feeding, and breeding of dairy cows. As a result many were unsuccessful as dairymen and disposed of their cows. Most of the factories in these sections operated for only a short

time and then closed because of an insufficient volume of milk. A few farmers in some communities went into the dairy business on a larger scale. Cheese factories in these communities have made progress and are to-day operating successfully. The milk is cooled in springs, and a good-quality product is delivered at the factories. This makes it possible to manufacture a good quality of cheese from unpasteurized milk.

In 1928, because of improved roads and the use of automobile trucks, even larger factories were established in the mountain districts, and milk was gathered from larger areas. At this time the operation of cheese factories in the southern mountains was no longer an experiment, as it had been found that a good quality of cheese could be made if proper methods were used.

FIGURE 19.—Modern cheese factories in the South

It was still believed that cheese factories could not be operated successfully in the lower altitudes of the Southern States because of unfavorable climatic conditions. Some good-quality cheese, however, had been made in western Tennessee, and in 1927 one of the large cheese companies started a factory in Mississippi. It was successful and very soon the cheese industry extended into Alabama, Arkansas, Texas, and Oklahoma, where the climate is much warmer than in the mountain sections. Many of the factories are of modern design (fig. 19) and well equipped. Although some are cooperatives, most of them are owned and operated by individual companies. The capacity of the factories ranges from 10,000 to 70,000 pounds of milk daily, which is much more than that handled in the factories formerly built in the South. As the herds in these States are usually small and somewhat scattered, in order to get a sufficient volume of milk it is necessary in some localities to operate routes within a radius of 30 miles of the factory, which has been made possible by improved roads and the use of automobile trucks. The milk usually arrives at the factory about noon, some of it with an acidity of 0.25 per cent and occasionally higher. Pasteurization makes it possible to handle milk with this high acidity.

Seventy Per Cent of Southern Factories Pasteurize Milk

Cheese factories throughout the South are being operated successfully where a sufficient volume of milk is received and proper manu-

facturing methods are used. Where milk is gathered from large areas and has developed considerable acidity when received, a higher and more uniform quality of cheese and larger yields are being obtained at factories that are properly pasteurizing such milk. About 70 per cent of the factories in the South are pasteurizing the milk at 160° F., by what is known as the flash method. Since only the smaller factories are not pasteurizing, it is safe to say that at least 90 per cent of the cheese manufactured in the South is made from pasteurized milk. The factories are usually equipped with mechanical refrigeration unless the cheese is shipped to a central curing plant or cold storage when from one to five days out of the press.

In 1914 no cheese factories were operating in the South. In 1928 approximately 60 factories manufactured over 6,000,000 pounds of cheese valued at over $1,000,000.

H. L. Wilson,
Associate Dairy Manufacturing Specialist,
Bureau of Dairy Industry.

CHESTNUT Blight Does Not Mean Early End of Tannin-Extract Industry The United States now obtains from Argentina, Natal, India, and other foreign countries over one-third of the vegetable tannins used in the making of leather. The American chestnut is the source of over 50 per cent of the tannin materials grown in this country. The manufacture of tannin extract from chestnut wood and bark developed especially

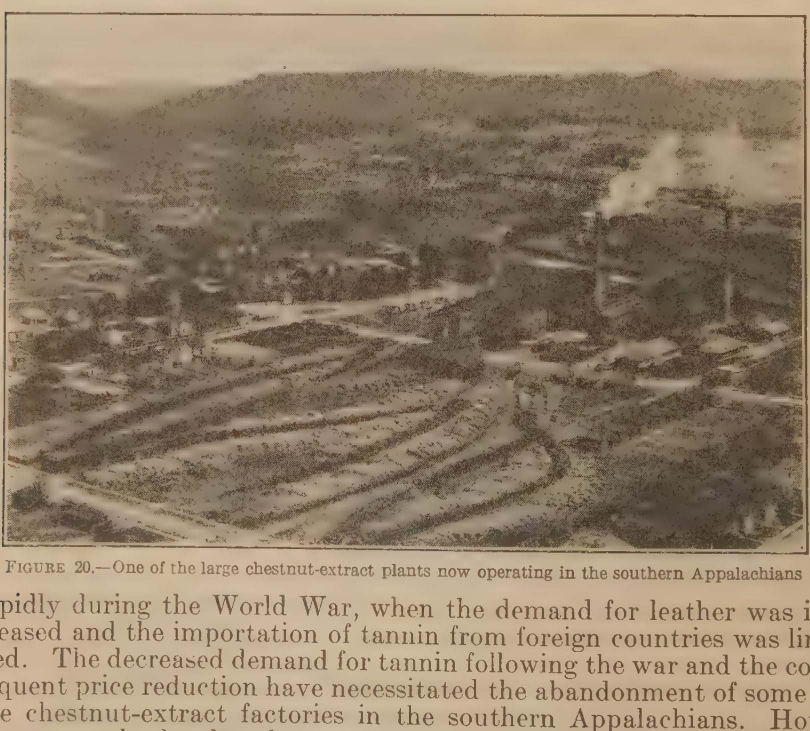

Figure 20.—One of the large chestnut-extract plants now operating in the southern Appalachians

rapidly during the World War, when the demand for leather was increased and the importation of tannin from foreign countries was limited. The decreased demand for tannin following the war and the consequent price reduction have necessitated the abandonment of some of the chestnut-extract factories in the southern Appalachians. However, recently developed processes for making paper and fiber board from the chips left after the extraction of tannin seem to have mate-

rially improved the financial condition of the extract industry. Figure 20 shows one of the 21 chestnut-extract plants located in the southern Appalachians.

Unfortunately, both the chestnut-extract and the chestnut-board industries seem doomed by the chestnut blight. This disease is caused by an Asiatic fungus (*Endothia parasitica*) which was first reported in this country near New York City in 1904. The blight, which usually kills a tree in one to five years, has spread so rapidly on the native chestnut that there is only a very small percentage of chestnut alive north of Mason and Dixon's line. In the southern Appalachians the disease has also spread at a very rapid rate, so that at the present time, as shown by Figure 21, a large part of the growth of this region is infected or killed.

Dead Wood Loses Tannin Very Slowly

The death of the chestnut stand does not mean the immediate end of the chestnut-extract industry, as dead wood loses its tannin very slowly. Studies have recently been carried out, in cooperation with the Bureau of Chemistry and Soils and with chemists of the chestnut-extract industry, on trees that had been killed by belting or by forest fires in a number of localities in the southern Appalachians. These trees are considered fairly comparable to blight-killed chestnuts. The studies indicate that the percentage of tannin in trees dead as long as 25 to 30 years is not materially less than that in living trees. Blight-killed trees lose their sapwood and bark within a few years after their death. However, the loss of the sapwood, which averages only about one-fourth inch in thickness and has a low tannin content (2 to 4 per cent), is of little importance. Even the loss of the bark, which has approximately the same tannin content as the heartwood (7 to 12 per cent), is not always a serious matter, because peeled wood is necessary in some of the processes for utilizing the chips left after the extraction of tannin. Of course, a large part of the chestnut stand will not be available for the manufacture of chestnut extract, because it will be utilized for other purposes or will be lost through forest fires and decay of the heartwood.

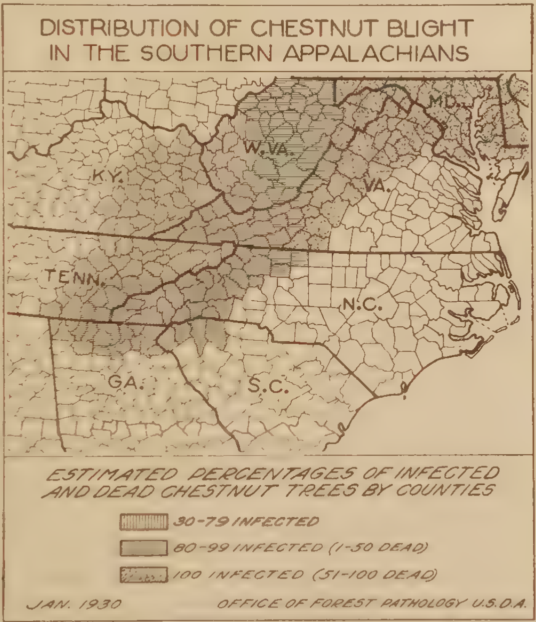

FIGURE 21.—Distribution of chestnut blight in the southern Appalachians

Even though it is possible to use native chestnut trees for 30 years after their death to make extract, the probability of finding and grow-

ing enough blight-resistant chestnuts in time to provide for the continuation of any material part of that part of our present extract industry now dependent on chestnut is rather small. The results of extensive searches for blight-resistant American chestnuts made in the earliest infected regions and the investigation of the reports of resistant trees, seedlings, and sprouts have been rather disappointing, as most of the trees have turned out to be only blight escaping instead of truly blight resisting. Work is being continued with the most promising sprouts and trees. The Asiatic chestnuts are more promising, as observations in this country and in Asia indicate marked resistance to the blight when the trees are growing under favorable conditions. An expedition of the Bureau of Plant Industry has spent two years in Japan and Chosen (Korea) selecting seeds from blight-resistant forest trees, and many thousands of seedlings from them are now growing in this country. Further studies are necessary before the value of these trees for extensive planting operations can be determined.

G. F. Gravatt,
Senior Pathologist, Bureau of Plant Industry.

CHLOROPHYLL, Cause of Greenness in Plants, Is Influenced by Nitrogen The universal green color of plants is familiar to all of us. The substance which is responsible for this green color has been called chlorophyll. It is an organic material composed of the elements carbon, hydrogen, oxygen, nitrogen, and magnesium. Pure chlorophyll is not a simple organic compound but consists of a mixture of two very similar components which have been called a and b. Two yellow plant pigments which are closely associated with chlorophyll in leaves are carotin, the yellow coloring material of butter and of carrots, and the less commonly known xanthophyll, which is found in the yolk of eggs.

Chlorophyll has been studied more intensively than the other plant pigments and while there are still many questions concerning it which remain unanswered, some things have been learned about its great importance in connection with the growth of plants. Chlorophyll is the pigment which is connected in some way with the production of organic matter in the plant and this production is related in a complicated and not fully understood way to sunlight. The energy coming from the sun is thus utilized by the organic compounds to produce the material of which the plant is composed. In the process carbon dioxide and water are used by the plant and oxygen is given off. The association of chlorophyll with the production of organic matter is quite important for it is by this means that all our food products are made. There is some evidence for believing that in this constructional process chlorophyll is being constantly formed and broken down in the leaf, and that the amount present at any one time is the result of these building-up and tearing-down processes. The rate of formation of carbohydrate is proportional to the amount of chlorophyll present. A plant in which the leaves are rich in chlorophyll will grow more rapidly than one in which the leaves are deficient in chlorophyll, other conditions remaining the same.

Fundamentally Important to Agriculture

Since chlorophyll is so intimately connected with plant growth it is of fundamental importance to agriculture, and investigators are now attempting to determine more of its properties, how it works, and how to control it, if possible. Experiments to show the effects of various fertilizer ingredients upon the building up of chlorophyll have been performed and it has been shown that fertilizers high in nitrogen cause plants to become a very deep green readily. Potash which has such pronounced effects on certain other phases of plant growth seems to have a relatively small effect on the greening of plants. A fertilizer high in phosphorus seems to produce plants which have more chlorophyll than those fertilized mainly with potash and less than those fertilized mainly with nitrogen.

It has been found that the character of the soil has much to do with the chlorophyll content of plant leaves, some soils favoring a higher content than others. In some soils, also, there seems to be no relation to the kind of fertilizer added and the amount of chlorophyll produced.

Effects on chlorophyll content are also found which can be traced to variations in the weather, differences being found according to whether it is day or night, bright or cloudy, hot or cold, but these data are so involved that much work remains to be done to reduce the information to well ordered knowledge.

FRANK SCHERTZ,
Associate Biochemist, Bureau of Chemistry and Soils.

CHRISTMAS Tree Demand Is Means of Improving Pike National Forest "Where must I go to get 11 carloads of Christmas trees?" was the opening sentence in a letter addressed to the district forester at Denver, Colo., recently. Eleven carloads means about 35,000 trees. Back in 1920, when serious thought was first being given to forest improvement through possible Christmas-tree demand, a sale of 100 trees was made on the Pike National Forest. Considerable persuasion was required to make this first sale. The purchaser was skeptical about the practicability of securing salable trees through improvement thinnings. By 1925, when 10,000 trees were cut in the Pike National Forest, the success of the venture was fairly well assured. For the season of 1928, 20,000 trees were cut.

The Denver market normally demands about 40,000 trees annually, plus some 500 tons of boughs for grave blankets, wreaths, and rope. Boughs are incident to Christmas-tree cutting operations since many of the trees cut are not salable as Christmas trees. For instance, a thinning operation sufficient to yield 10,000 salable trees requires ordinarily the cutting of from 250,000 to 500,000 trees, with a resultant thinning on 50 to 100 acres.

Prior to the entrance into the field of the Forest Service, local demand for trees was supplied by promiscuous and destructive cutting on private lands or by vandals who cut the tops from thousands of trees along mountain highways and roads.

Fir Stands Too Thick for Good Growth

Scattered throughout the foothills region of the Pike National Forest are thousands of acres of young stands of Douglas fir much too thick

for proper growth. It is these stands which are sought out by forest officers and thinned. In a properly conducted thinning operation in dense stands of from 1,000 to 10,000 trees per acre, ranging from 5 to 20 feet in height and from 15 to 40 years of age, all trees are cut except 500 to 1,000 of the better and more vigorous specimens. These are left to grow into large trees which at maturity are suitable for railroad ties and lumber. On experimental plots of 1 acre each it has been found that the annual diameter and height growth on the thinned plot is two to four times greater than on the unthinned check plot.

The production of Christmas trees through improvement thinnings on the Pike National Forest pays its way under almost all conditions. In average stands the operation shows a fair profit. On exceptional areas an acre has yielded 500 salable trees. These trees were sold at a flat price of 15 cents each, cut and in the woods. The cost of cutting was 5 cents per salable tree, leaving a net return per acre of $50. Net returns of from $5 to $25 per acre can reasonably be expected in our average young stands of Douglas fir. This is the immediate profit. The future profit in the way of greatly increased growth in trees left can only be guessed. It is evident, however, that trees suitable for lumber and ties will be obtained in much less time and that the quality should be much higher.

E. S. Keithley,
Supervisor, Pike National Forest, Forest Service.

CHRISTMAS Trees a Profitable Farm Crop in Some Localities Christmas-tree growing offers the farmer a profitable side line that brings in extra income at a time of year when it is particularly acceptable. Moreover, it suggests a way to utilize odd corners of tillable land not needed for other crops or waste land suitable for reforestation.

It is, of course, essential that a ready market for the trees be available. Before starting a plantation, nearness of markets, possibility of strong competition from wild or natural-grown trees, and the presence of other similar plantations should be considered. Generally speaking, the Eastern and Central States offer the best opportunities.

The ideal Christmas tree should be symmetrical with a dense conical crown, fragrant, and retentive of its foliage in a warm room. The species selected should grow fairly rapidly in order to make the business pay. The spruces and true firs combine many of these qualities.

Norway and blue spruce are hardy through the East and Middle West and make excellent Christmas trees. (Fig. 22.) The Norway spruce (*Picea excelsa*) is more rapid growing than blue spruce (*P. pungens*) but is not so beautiful a tree. White spruce (*P. glauca*) is particularly well adapted to the colder parts of the country. Among the true firs, white fir (*Abies concolor*) and Nordmann fir (*A. nordmanniana* are suitable for Christmas-tree planting. Balsam fir (*A. balsamea*), because of the tendency of its foliage to thin out when planted outside its natural range, is not so good as the others mentioned. Douglas fir (*Pseudotsuga taxifolia*) makes a good Christmas tree. To insure hardiness, stock grown from Rocky Mountain seed should be insisted upon. Deodar cedar (*Cedrus deodara*), a tree brought to the United States from Asia, is particularly well adapted to growing on the Pacific coast and in the warmer parts of the Eastern and Central States.

Establishment and Care of Plantation

Good, strong 4-year-old transplants should be used. These may be obtained from reputable nurserymen or from State foresters; they are trees that have been transplanted for at least one year in the nursery. If cultivation is contemplated, a spacing of 4 by 4 feet is recommended. If not and if Christmas-tree production is incidental to timber growing, the spacing may be reduced to 3 feet or a little less; and as trees become salable they can be taken out as thinnings.

FIGURE 22.—A Christmas-tree plantation of 4-year-old Norway spruce transplants: A, During the first growing season; B, three years after establishment

Cultivation shortens the time when some income may be realized from the plantation and reduces fire hazard. Preparation of the site by fall plowing and disk harrowing in the spring is advisable when cultivation is to be practiced. The weeds may be kept down and the growth of the trees stimulated by running a cultivator between the rows three or four times each summer for the first two years. When

cultivation is discontinued, the maintenance of a plowed fire line around the tract affords protection from fire.

With sturdy transplant stock and the treatment described above, trees should begin to reach merchantable size (4 to 7 feet in height) within four or five years after the plantation is started. Not all trees grow at the same rate. Because of this, additional trees will reach salable size each year. By the time the plantation is 10 years old practically all of the trees originally set out should have been harvested.

While the trees most readily sold are from 4 to 7 feet tall, there is a growing demand for trees of table size 1½ to 3 feet tall. These may be sold either as cut trees or as living trees, with roots packed in wet moss, in tin cans or pots. These trees begin to reach table size about two years after planting.

Home-grown trees bring the best prices because of their freshness and symmetrical form. Cutting may be delayed until orders are actually obtained. Handled in this way the crop is in no way perishable, for any surplus may be held for sale the following year.

F. H. Eyre,
Associate Silviculturist, Forest Service.

CLUB Activities Are Followed Up in Father-and-Son Partnerships

Cooperative extension work in agriculture and home economics includes activities for men, for women, and for boys and girls. Separation of adult and junior activities has been quite complete, although often conducted along closely related lines. With this segregation, the county extension agent is often confronted with the question of what extension work can be done by rural young people from 20 to 25 years of age. Many 4-H club members reach their fullest development at about the time that the maximum club age is reached. Unless some special activity is arranged for these young people, the extension agent is often deprived of their assistance just as they attain the ability to render most efficient service in extension work. Many extension agents have attempted to meet the situation by urging them to become local leaders of 4-H clubs. The interest of some of the former 4-H club members is thus maintained, but the larger number not in club work or who have not previously been in club work are not reached. Some special type of activity for this particular group is needed.

FIGURE 23.—County agent explaining farm accounts to club members and their father

Extension workers in Minnesota have provided a new plan. The maximum age for 4-H club membership in that State is 20 years. As club work has been conducted in Minnesota for many years, numerous club boys with several years of experience in organized 4-H clubs have now reached the age when they should be assuming some responsibility in the farm business. Many other young men of the same age group on the farms of the State have not been members of 4-H clubs.

Plan Started by County Agent

To interest young men who are beyond 4-H club age, a father-and-son partnership plan has been established in certain counties, especially in Redwood and Martin Counties. The plan, first instituted by the county extension agent in Redwood County, involves a partnership of father and son to carry on some particular phase of farm work under the direction of the extension agent.

The lines of work chosen for these two counties are dairying, poultry, baby beef, swine, and sheep. Some of the older boys entered a rental-lease partnership for the entire farm business. The ages of the boys range from 20 to 26 years. Monthly meetings of a business and social nature are held. These regular meetings may be varied or supplemented by an inspection tour or a picnic. Farm business records are kept on the particular work included in the partnership project. At the end of the year these records are submitted to the State club office and farm management department at the agricultural college. During the winter months a lecture-laboratory course on The Business Side of Farming was presented to the Redwood County group. Last year a joint representative of the 4-H club department and the farm management department at the Minnesota College of Agriculture was appointed to supervise the father-son partnership activities in the southern counties of the State.

FIGURE 24.—Farmers and their sons learning seed-corn selection from the county agent

Rural young people seemingly welcome an extension activity designed especially for them. An organization for social purposes alone holds such a group only temporarily and does not warrant the efforts of extension agents. The partnership project, however, not only familiarizes the group with extension activities but provides a workable basis for wholesome social relationship.

R. A. Turner,
Senior Agriculturist, Extension Service.

COOPERATIVE Associations Aided by Extension Service in Marketing State extension specialists in marketing have rendered substantial service to farmers and their families. The specialists have been able to get the most effective results and multiply the services rendered by working through the county agents and the farm organizations. Such joint effort aids in determining the outstanding marketing problems and makes attempts to solve them more effective.

The marketing specialists of South Carolina found that the greatest handicap in obtaining a profitable price for farm products was lack of standardization. Through shipping-point inspection in cooperation with the South Carolina asparagus growers, the asparagus industry in this State climbed from a low-quality place on the New York and Boston markets to the top in three years' time and increased its acreage 300 per cent. Shipping-point inspection brought about improved pro-

FIGURE 25.—Farmers putting into practice new methods of bunching and packing asparagus taught by extension agent

duction methods as well as a change from a slack pack of low quality to a full pack of top quality. By proving to the asparagus producer that increased returns resulted from these marketing methods, the extension specialists led several other organized groups of fruit and vegetable growers to adopt similar methods.

The marketing economists in Ohio have been active in pointing out to members of cooperative marketing associations that highest net returns can be obtained for the producer only when a high-quality product is delivered for sale.

Three examples may be cited. An analysis of the veal calf shipments in one Ohio county showed that 66 per cent of its veal calves sold at a premium. The owners of the premium calves have been active members of a purebred sire project started six or seven years ago. In the same county only 40 per cent of the lambs are being sold in the top grades on the market. The trouble is with the producer, who has not appreciated the importance of controlling parasites and the ne-

cessity of proper feeding to make finished lambs at weights demanded by the higher-quality market grades. In one year a 20 per cent improvement in the quality of lambs was made.

Losses in Transit

In Shelby County, Ohio, an analysis of 1925 and 1926 shipping records of the livestock-shipping association showed an annual loss of $3,500 from dead and crippled animals in transit. A further analysis showed that 82.4 per cent of the loss occurred in hog consignments, which comprised 63 per cent of the total head shipments for the two years. This hog loss was equivalent to an insurance rate of 7 cents per 100 pounds shipped in 1925 and 11 cents per 100 pounds shipped in 1926. The loss was equal to about half the total home-marketing charges of the association. Part of the loss from dead and crippled animals was attributed to improper loading, part to rough handling by the railroad, and part to improper handling of the hogs by the producer just before shipment. Further analysis, in cooperation with the animal husbandry department of the Ohio State University, revealed that the hogs were not receiving sufficient bone-building material on the farm and that much of the crippling was due to faulty feeding. Correction of the feeding methods resulted in cutting the insurance charges to approximately 3 cents per 100 pounds instead of 11 cents, which was the rate in 1926.

FIGURE 26.—County agricultural agent demonstrating the grading of potatoes for market

Iowa has 8 extension marketing economists; 3 of whom cooperate with livestock-shippers' associations, 2 with grain-dealers' associations, 2 with creamery associations, and 1 with poultry-marketing organizations. The marketing economist confines his efforts to a single commodity. He must know the essentials of efficient operation of the cooperatives in his field, what records are needed for an accurate analysis of the association's business, and what marketing information the manager and officials of the association must have in order to obtain the highest net returns for the producers. The livestock economists of Iowa keep constant check on net returns from various livestock markets and make available to cooperatives the results of their studies. The grain-marketing economists analyze hedging and credit problems; they also analyze audits of 100 farmer elevators, showing volume of business, expenses, margins on different grains sold, and financial returns on side lines, which are of great interest and value to officials and managers. Similar work with dairy and poultry cooperatives by Iowa marketing economists has proved valuable.

Promoting More Uniform Milk Supply

In New England the extension economists rendered service to dairymen's cooperatives by suggesting adequate means of equalizing the milk supply throughout the year. The late spring and early summer are seasons of high production, while late fall and early winter are seasons of low production. In cooperation with the dairy and crop specialists, the marketing economist tries to impress on the farmer and on the association management the desirability of having cows freshen late in the fall, so that they will reach their peak production when the supply normally is falling off. They also urge the necessity of producing succulent feed and good hay to maintain the flow of milk during the fall and winter.

In several Southern States, home demonstration agents and marketing economists are active in organizing club or curb markets at which members of women's and girls' clubs sell fruits, vegetables, flowers, poultry, eggs, dairy products, and a wide variety of products made by farm women. Sales by southern women at these markets during 1928 exceeded $1,000,000.

In Okmulgee County, Okla., in 1927, the county agent took the initiative in assisting farmers to establish a better system of marketing eggs. A year later the success of the organization justified reorganization on a 5-year basis. Each farmer candles and stamps his eggs so that they are readily identified as fresh eggs when sold. The central marketing agency sells the eggs with a maximum handling charge of 2 cents per dozen. The association has been so successful that so far not a single member has withdrawn.

Extension work in marketing is in its infancy and has ahead a broad field of endeavor. This fact makes the part of the extension employee one of extreme interest and large opportunity for worth-while service to the farmers of the United States.

B. B. Derrick,
Cooperative Marketing Specialist, Extension Service.

COOPERATIVE Directors and Officers Have Legal Responsibility

One of the more important provisions in the cooperative marketing acts of the various States is that which, in keeping with common law, vests in the boards of directors of associations formed under those statutes the conduct and control of their corporate powers and business. With their detailed provisions respecting the board of directors, these statutes have done much to emphasize to farmers the advantages of the corporate type of organization, and at the same time have impressed upon the directors of the associations that theirs are not merely positions of honor, stripped of responsibility.

A man was prevailed upon to accept membership on the board of directors of a corporation because of the prestige his name would lend to the organization. It was not contemplated that he should participate in the conduct of the affairs of the corporation, neither was he expected to attend meetings of the board. The court held, however, that no understanding which he may have had with the corporation could relieve him from the exercise of that degree of care with regard to the conduct of its business which a prudent man would exercise in his own affairs.

Officers of incorporated associations must exercise diligence and care in the performance of their duties; they are presumed to be familiar with the by-laws of the association and to have taken the ordinary methods to inform themselves in relation to its affairs. If they are guilty of gross negligence with regard to the conduct of the affairs of the corporation, or if they remain silent when they are aware that a fraud is being perpetrated against it, they are liable.

An incorporated association is bound by restrictions imposed by its charter and by-laws, and to that extent the powers of directors and other officers are necessarily limited. Therefore, for acts in excess of their powers such officers are liable for damages caused the association. It has been held, however, that the directors were not liable for acts which are beyond the powers conferred upon a corporation by its charter if all the members of the corporation acquiesced in them.

A phase of the relation of a director to his corporation which has been before the courts many times is that involving his personal interest in transactions in which he participates in behalf of his corporation. It is uniformly held that in view of the position of trust and confidence which he occupies, he can not either directly or indirectly acquire any personal advantage in any transaction on behalf of the corporation.

H. M. Bain,
Specialist in Legal Phases of Cooperation,
Bureau of Agricultural Economics.

COOPERATIVE Directors Primarily Responsible for Association Policy In a cooperative association the members delegate the responsibility for directing the business of the association to a board of directors. The board of directors, when elected and constituted according to the by-laws of the association, becomes the legal agent or representative of the membership for the purpose of directing and conducting the business. The directors are collectively and individually liable for carrying out the purposes of the business. They are legally and ethically obligated to determine policies and supervise their execution. The policies must be within the limits established by the charter, by-laws, and marketing agreement of the association. Usually these are rather broad limits and give the directors ample latitude for the development and enforcement of broad general policies as well as major and departmental policies.

Responsibility for all policy formation rests clearly in the board of directors, but it is permissible, in its discretion, to allow the general manager to participate. Since the general manager is to be made responsible for the execution of the policies, it seems proper that he should be a party to their determination, but the board should never permit him to dominate it in the matter of determining policies. He is primarily an executive and should not take undue initiative, or take advantage of an opportunity to get his own policies accepted by the board. One-man control is dangerous to the success of an enterprise, no matter how good the man may be or how excellent his judgment. The consensus of a group of men is to be preferred to the opinion of a single man. Group action may be slow and trying at times, but it proves more successful in the long run.

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Directorship Not Merely Honorary

Membership on a cooperative board of directors is usually looked upon as a post of honor, but at the same time it should be recognized as a place of great legal responsibility. A director is expected to exercise the same degree of care in directing and supervising the affairs of an association that prudent and diligent men exercise in the conduct of their own business. Failure to exercise this degree of care, or to be honest and diligent in attending to the affairs of an association, may render directors liable, at common law, to the association, to its receiver, or to members of the association acting in its behalf under some circumstances.

Authorities agree that an association may recover from its directors any losses which it suffers because of their dishonesty. Gross negligence on the part of directors which permits other directors to defraud an association renders all of them liable. Inattention on the part of a director may render him liable to his association in those instances in which attention to duty should have prevented the loss of a specific amount.

Cases are rare, if not nonexistent, in which a director, although inattentive to his duties, has been held liable on account of the general collapse of a corporation, when fraud or specific losses traceable to specific transactions are not involved, but the legal liability of a director emphasizes the importance of policy formation and a careful supervision of the execution of the determined policies.

Realization of the aims, possibilities, and limitations of cooperative business has been a gradual development. Many mistakes have been made and much experience has been gained. Hundreds of farmers have had an opportunity, during the past few years, to get their first real contact with big business. Out of the mistakes and experiences of the past will grow a more conscious need for the scientific establishment of policies for the successful conduct of cooperative associations.

Tendency to Rely on Manager

Many associations have relied to a large extent upon the general manager or some outstanding personality on the board for policy formation. This is probably always the case in new associations where many members of the board are inexperienced. The natural tendency in such cases is to lean rather heavily for guidance upon those with experience. Officials of new associations are often men who were active in the organization campaigns, and, in many cases, the persons who later become directors get their first lessons in cooperative marketing from these executives. The result is the placing of a large degree of dependence on one or two men.

The tendency to lean heavily on one or two men is accentuated by the fact that the director usually spends but little time in close contact with the business problems of the association. As the board meets for only one or two days each month, the director knows very little at first hand about the detailed problems, whereas the general manager is on the job constantly and is well posted.

The solution of the problem of directing and managing cooperative associations lies in the development of leadership. An association's progress is in direct ratio to the character and quality of the men in

control. A new board of directors of a cooperative should assume their legal and ethical responsibilities by immediately formulating definite and stable policies.

JAMES S. HATHCOCK,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

COOPERATIVE Marketing of Eggs Is Stimulus to Poultry Industry Each of nine cooperative associations marketed over 1,000,000 dozen eggs, during 1928. The total volume of eggs marketed by these nine associations was 104,839,724 dozen. All of these larger associations are located west of the Mississippi River and all but two are in the intermountain or west coast area. In the intermountain and west coast areas, the cooperative egg marketing associations have increased the volume of eggs sold year by year. Because of the operations of these cooperative marketing associations in moving local surpluses to the eastern markets, the West has developed several intensive poultry-producing sections where large flocks are handled on a commercial basis. In most of these producing sections, poultry was comparatively unimportant prior to the inauguration of cooperative marketing services.

FIGURE 27.—Eggs gathered from a poultry ranch in the Petaluma district. The eggs are packed in cases and delivered daily to the cooperative associations

East of the Mississippi River cooperative-marketing associations are numerous but they do not handle large volumes. They are usually located near large markets and, typically, are the result of an effort on the part of nearby producers to market their eggs on the basis of quality

and to sell them under special brands. In many instances this type of marketing activity is meeting with considerable success.

Chickens are a by-product of commercial egg production or of diversified farming operations. They are frequently pooled in shipments of carload lots of live poultry. A few creameries or egg marketing associations are operating poultry-dressing plants. In the South there is considerable activity in pooling cars of live turkeys and there are a few cooperative turkey-dressing plants.

Throughout the Intermountain and Western States turkey production has become important largely through the operation of turkey-marketing organizations. These are generally collective bargaining associations through which producers sell their turkeys in carload lots direct to wholesale buyers.

GORDON W. SPRAGUE,
Associate Agricultural Economist,
Bureau of Agricultural Economics.

COOPERATIVES Recognize Necessity for Setting Up Adequate Reserves All successful cooperative-marketing associations have found it necessary to provide adequate reserves for possible losses. Some of these losses are relatively certain in amount such as losses from bad debts, depreciation, and obsolescence. Other losses are uncertain in amount, but are inherent in every business; these losses are provided for usually by creating a reserve for contingencies.

Frequently, too, cooperatives have adopted the policy of creating reserves to provide for their working capital needs. Funds offsetting this reserve may be used to pay operating expenses during periods of the year when income is inadequate to maintain the association. Working capital is also required for carrying inventories, making advances to growers, carrying accounts receivable with customers, and for other purposes depending upon the type of association and the products handled.

Nonstock cooperatives have found it necessary to make special provisions for capital by creating reserves. Failure to provide adequately for these needs has placed several associations in perilous financial difficulties, even when associations have not been faced by other than the usual hazards incident to business.

It is essential to analyze each of the operations being performed by the association from the point of view of financial losses which might occur. Reserves should then be provided for each possible contingency. Extreme caution in entering upon opportunistic ventures should be the rule followed by the managers of cooperative associations, especially if adequate reserves have not been provided for before entering upon new ventures or methods of marketing.

The management of reserve accounts is most important. It must be remembered that reserves are created for definite purposes. Buildings, equipment, and other such assets gradually wear out or become obsolete. Out of the aggregate of accounts receivable, experience indicates that a rather definitely measurable amount will never be collected. Certain indefinite losses will surely occur. The associations will need funds for operating expenses or for new structures, and for many other known and unknown financial needs.

Assets to Offset Reserves Must Be Liquid

The offsetting of reserve accounts by assets which are not real, defeats the objects for which the reserve accounts were created. For instance, when a balance sheet reveals that reserves for contingencies are offset completely by frozen assets, such as organization expense or other accounts of no liquidity, it is not surprising that such an association has financial difficulty when need for the reserves arises. Assets offsetting reserves must be liquid enough to meet all situations for which the reserves were created.

Reserves are often allocated to growers by issuing certificates of indebtedness. These certificates, when carrying a definite date of maturity, become a certain form of debt, especially in the eyes of the grower members. Consideration should be given to the exact method of issuing certificates. Many associations find it more desirable to allocate merely a portion of the reserves in the form of certificates, keeping the balance on the books of the association. The needs for funds vary, and it is difficult to foretell the necessities that may arise during the life of the association. The policy of paying back the reserves, therefore, needs careful consideration before definitely committing the association.

In setting up reserves, it is best to err on the side of conservatism. Management is frequently overenthusiastic or extremely optimistic, and factors of safety must always be calculated for every phase of the cooperative business enterprise.

Adequate reserves which are available to cover not only the probable but the unexpected losses as well, and to provide sufficient working capital as the association expands, have been found necessary in practically all successful cooperative associations.

J. E. Wells, Jr.,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

CORN-BORER Battle Enlists Many Kinds of Farm Machinery The most effective means for control of the European corn borer, that may be applied extensively, is destruction of the pest by mechanical equipment. In applying mechanical-control measures two general conditions must be met: (1) Disposal of the standing stalks and crop débris left in the field after the corn has been picked by machine or by hand and (2) disposal of the whole crop after it has been cut and removed from the field.

Disposal of Crop Débris in the Field

Most of the corn crop débris can be covered by careful plowing, a measure that can be widely adopted. If the infested material is thus covered, the borers migrate when the soil temperature is favorable (50° F. or higher) and come to the surface in search of shelter in other plant remnants. If the stalks are buried to a good depth, trash will not be brought to the surface during weathering or by subsequent tillage operations, if proper tools are selected. With little or no shelter available, most of the borers will perish from exposure or the attacks of natural enemies such as birds and predatory insects.

Another efficient control measure is to detach or sever the stalks flush with the ground, rake them cleanly into windrows, and carefully burn them. For severing the stalks, the stalk shaver of either the wheel type or the sled type effects a nearly perfect job. To each side of the frame of the wheel type, and to each of the runners of the sled type (fig. 28), a serrated knife is mounted outwardly in a nearly horizontal plane to slash off the stalks even with the ground as the implement is pulled forward between the corn rows. Either type cuts two rows at a time, or four rows may be cut by hitching two of the sleds abreast. (Fig. 29.) The wheel type may be obtained from the farm-machinery manufacturers, and the sled type may be made according to plans that the department will furnish upon request.

FIGURE 28.—Two-row sled type of stalk shaver

Poling or railing to break off the stalks, by dragging a log or railroad iron across the field after a heavy freeze, has been practiced to some extent, but is not sufficiently effective for corn-borer control. Often so many of the stalks are not broken off that clean raking is impossible. Also, many of the stalks that are broken off shatter at the butts and cause the contained borers to be scattered about on the ground.

FIGURE 29.—Two sled-type stalk shavers used as a unit cutting four rows of stalks

Raking the stalks into windrows for burning, after they have been shaved off, may be done effectively by a side-delivery rake (fig. 30) if the stalk growth is not too heavy. The present type of side-delivery rake was designed for harvesting hay, however, and is not sufficiently sturdy to handle a heavy growth of cornstalks without danger of injury. A dump rake can be used to gather most of the stalks into windrows, and the side-delivery rake for whisking the remaining débris into the same windrows. On windy days, clean raking is difficult with any of the implements, because of the blowing about of the débris.

A special cornstalk dump rake now on the market gives much better results than the regular hay dump rake. It is more rugged, and is fitted with heavier teeth placed closer together. Development of a special side-delivery rake that will handle heavy growths of cornstalks without difficulty and rake them into windrows in one operation is progressing favorably.

Burning of the stalks can be accomplished in the ordinary way when they have been raked into windrows and somewhat dried out. Then, by hand raking into the flames any stalks which may have escaped, practically a complete kill of the borers is obtained.

FIGURE 30. -Side-delivery rake gathering cornstalks into windrows

Experiments have been conducted, and development work is still in progress, with mobile types of burners and a steamer that will burn or steam the standing stalks and crop débris so as to kill the contained borers outright. Owing to the variety of conditions to be met and some mechanical problems involved, these machines are not yet worked out on a practical basis.

Harvesting and Disposal of the Whole Crop

When the whole corn crop is to be removed from the field, the stalks must be cut at the ground surface if all the borers are to be gathered. The standard corn binder leaves stubble at least 4 or 5 inches high, which may contain many borers. Harvesting of the whole stalk may be accomplished with a simple low-cutting attachment which has been developed for use on four popular makes of corn binders. This attachment consists essentially of a long stationary knife to sever the stalks, set below and just ahead of the regular reciprocating knife; an elevating chute to prevent the stalks being cut a second time, by the reciprocating knife; and extension butt gatherer chains and extra throat springs to grasp the stalks as they are cut and carry them into the machine. As the binder moves forward, the stationary knife cuts off the stalks even with the ground while the weeds and grass pass beside the chute and are cut by the reciprocating knife to prevent clogging in

the binder throat. For cutting corn by hand, a special low-cutting tool has been devised. Both the low-cutting binder attachment and the low-cutting hand tool are described, and directions for making them are given, in Miscellaneous Publication 56-M of the department. The attachments may also be obtained from the binder manufacturers.

After the corn is removed from the field, careful disposal of the fodder is necessary. The ensiling process of cutting the fodder into short lengths and blowing it into the silo, effects a high mortality. Should any borers escape the knives, the fermentation process in the silo will cause their destruction.

Another machine, the silage harvester, effects practically the same result if equipped with a low-cutting knife. This machine, which is pulled along the corn row by a tractor, cuts off the stalks at ground level and causes them to pass up a chute into a cutter head where they are cut into approximately one-half inch lengths. A conveyor passes the cut-up corn or silage into a wagon drawn beside the harvester, from which it may be blown into the silo.

The husker-shredder also effects a high mortality in borer-infested stalks. From many tests with used farmer-owned machines and with new machines working under various conditions, it was found that kills of 90 to 98 per cent were obtained when the fodder was fed uniformly, with the machine running at normal speed and adjusted for a high pressure on the snapping rolls. This pressure, of course, should not be sufficient to cause undue heating and damage to the snapping roll bearings. Borers not killed in the rolls, shredder head, or blower may become desiccated in the mow, eaten when fed to stock, or trodden under foot. Fodder passing through a shredder in proper adjustment can therefore be spread upon the fields with little danger. In using either the silage cutter or husker-shredder, care must be taken to dispose of the loose borers found under the machine or in the shelled corn.

In addition to the machines described above, various others have been tried out or are in process of development, all for the purpose of killing the borer. The area infested is increasing rapidly, and so is the intensity of infestation. However, because of the progress already made in developing control machinery, it is expected that effective equipment for preventing extraordinary damage will be available by the time that repressive measures must be adopted generally.

R. B. Gray,
Senior Agricultural Engineer,
R. M. Merrill,
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CORN-BORER Control Much Facilitated by Deep, Clean Plowing "Clean plowing—a sure means of controlling the European corn borer," is accepted at its face value by most authorities and is becoming a slogan for the Corn Belt. While no one method can best meet all conditions, the plow has been very useful in reducing the number of borers, which can not complete their life cycle underground or live on top of the

ground without protection from birds, other natural enemies, and the weather.

Clean plowing means the complete burial of all trash (figs. 31 and 32), which is necessary for absolute control. It is difficult to bury all the stalks and thoroughly clean fields are seldom found unless plowing has been followed by hand picking. In fact, the first surveys of infested fields made by the corn-borer control forces showed that the average farmer was leaving about 30 feet of cornstalks per square rod of field, which was enough to shelter more borers than were present in the stalks before plowing. Plowing has improved greatly since that time, and a survey in 1928 showed that in the average field in which whole stalks were plowed under 13.1 linear feet of stalks per square rod were unburied when the spring work was finished, no hand picking having been done. One-eighth of the original borers were hiding in these stalks, however, and since the offspring of this number of survivors would ordinarily show a large increase over the preceding year, much cleaner plowing than this is necessary. But the improvement already made, and the interest shown by farmers and manufacturers in better equipment to replace the old as it wears out, are indications of cleaner work in the future.

FIGURE 31.—Clean plowing to control the European corn borer

During the compulsory clean-up campaign of 1927 hand picking and burning were often required to clean fields where the stalks were not well buried by plowing, and this practice was quite effective in killing borers. However, it is tedious, disagreeable work, coming at a busy season, and farm operations should be planned for proper control without it, using methods adapted to the local situation.

Soil Type Affects Cleanness of Plowing

The value of plowing as a control measure depends on the completeness of burial of the trash, and that in turn depends on the nature of the soil and the efficiency of the plows used. Figures obtained in extensive tests on three common types of soils near Toledo, Ohio, show the relative difficulty of obtaining clean plowing. (Table 1.)

TABLE 1.—*Débris left uncovered after plowing under whole cornstalks, on certain types of soil*

Soil type	Average total length not covered, per square rod with—		
	Best plows [1]	Poorest plows [1]	All plows
	Feet	*Feet*	*Feet*
Sandy loam	0.44	3.34	1.89
Clay loam	2.65	9.91	6.75
Heavy clay	4.90	14.07	11.20

[1] Average for three plows.

The experiments from which these figures were obtained showed even more clearly than the tabulation that soil type and condition have a very large influence on cleanness of plowing. While Table 1 shows that there was six times as much material uncovered on the heavy clay and three and one-half times on the clay loam as was left on the sandy loam, field observations showed similar differences in favor of soils which were well supplied with organic matter and well drained.

FIGURE 32.—A field on which tests for trash coverage were made

Most sulky or tractor plows of 14-inch width or larger can be made to do satisfactory work on soils which are mellow, easily plowed, and pulverized, either because they contain a large amount of sand or organic matter or because they contain just the right amount of moisture. Plows should be equipped with rolling coulters, jointers, and covering wires, and operated at a depth of 7 inches or more. A skillful plowman can do very clean work with such an outfit in mellow soil, and the few stalks left uncovered may be picked up quickly by a man or boy as the plowing progresses, and thrown into the open furrow to be covered at the next round. The range of conditions under which stubble may be turned under satisfactorily is somewhat wider than for whole stalks.

On heavy, intractable soils, which break up in large tough slabs when plowed wet and in big clods when dry, it is almost useless to try to plow under whole stalks well enough for corn-borer control. The proper procedure is either to pole down the stalks when frozen, harrow down when dry, or cut off at ground level with a stalk shaver; then rake and burn them before plowing. Even if the raking and burning is not a really clean job it will enable the plow to complete a satisfactory measure of control more cheaply than the hand picking that would otherwise be necessary. This practice, of course, increases the need for soil-building crops in the rotation.

On intermediate soils, which can be fairly well pulverized under most conditions, one has the choice of first raking and burning the stalks

and using common plows, or of using the most efficient plows available to turn under the whole stalks.

Characteristics of a Good Corn-Borer Plow

For most efficient coverage, plows should be selected which have plenty of clearance between the beams for the passage of stalks and for setting the coulters and jointers to best advantage, because when jointers and covering wires are used there is a tendency for stalks to clog between the jointer and the beam ahead. (Fig. 33.) The plows should also be free from low cross braces and projecting parts that would catch and drag stalks. The hitch plates on a tractor plow should be adjustable low enough to hold the plow level when operating with the tractor drawbar set about 12 inches above the ground. Hitching high on either the tractor or the plow often causes uneven running and seriously interferes with good coverage.

Large plows, with 16-inch and 18-inch bottoms, as a rule have proven to be more satisfactory than smaller plows on easily pulverized and intermediate soils, though such is not always the case on heavy soils. The shape of the bottom is fully as important as the width, and a type should be selected that lifts the dirt well, curves the upper edge of the furrow slightly forward as it falls, and lays it smoothly against the crown of the preceding furrow. The plow should leave a clean, wide, open furrow, at least 10 inches at the bottom, into which stalks may be turned at the next round. The covering power of bottoms varies in different soils, and actual field trial is the best way to select the right bottom for the conditions.

FIGURE 33. -A plow properly equipped for clean plowing, with large rolling coulters, jointers, and covering wires. Notice good clearance between the bottoms, and freedom from obstructions that might catch stalks

The plow should be provided with rolling coulters at least 15 inches in diameter; good-sized jointers, either in combination with the coulter, or standing; and a 10-foot covering wire fastened to each coulter shank and another to the axle of the furrow wheel, all of them arranged to drag over the turning furrow slices and keep the stalks from pitching. A good plow equipped in this way and carefully operated at a depth of 7 to 8 inches should turn under whole stalks on reasonably mellow soils to meet corn-borer control standards, unless weather conditions are unfavorable. High winds at the time of plowing will ruin the work of any plow, and even ordinarily mellow soils when too dry or too wet are difficult to plow cleanly.

Other Helpful Practices

Disking stalks before plowing is sometimes helpful. If the soil is dry and cloddy before plowing, disking may help the plow to pulverize it,

in that way improving coverage and at the same time cutting the stalks into short lengths that are not easily dragged out by the cultivator. On the other hand, if the ground is damp and heavy enough to pack, the disking may leave it more difficult to pulverize and thus hinder coverage. Rolling or dragging the stalks to lean them in the direction of plow travel is a benefit provided the stalks are not broken loose and the ground is not injured by packing. Extension rims on the land wheel of the tractor are sometimes of benefit, since they roll down the stalks and reduce soil packing. Where husking lands conform to plow lands the stalks are easier to turn under than where they are bent opposite to the direction in which the plow travels.

It is difficult to have headlands and backfurrows clean under any condition, as the ground is almost always packed on the headlands and it is impossible to place the stalks at the proper depth on the backfurrows. Disking or harrowing will bring them to the surface even if they appear nicely covered when plowing is finished. Therefore, the best way is to rake and burn these strips before plowing. If a 25-foot border around the entire field is treated in this way, it will dispose of most of the borers that might crawl out of the plowed land into fence rows or other fields to find new shelter for completing their life cycle.

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COTTON Breeding To-day Works with Main Types Known in Remote Past

There are two principal types of cultivated cottons — Asiatic and American. The American cottons may be classified roughly in two groups, the Mexican-Central American and the South American. Upland cotton (fig. 34) belongs to the first group, which is characterized in the main by whitish flowers without spots on the petals, large, smooth, rounded 4-lock or 5-lock bolls, relatively short, white lint, and very fuzzy seeds. The South American group, of which outstanding examples are the Sea Island, Egyptian, and Rough Peruvian cottons (fig. 35), is characterized in the main by yellow flowers with a dark red spot on each petal, rough, pointed, mostly 3-lock bolls, relatively long, cream or buff-colored lint, and smooth or only partly fuzzy seeds. The lengths of lint of these types are shown in Figure 36, and seeds are shown in Figure 37. Bolls characteristic of the two American groups are shown in Figure 38.

The Asiatic and the American cottons are so different that it is very difficult to make them cross or hybridize. On the other hand, it is easy to make crosses between any of the cultivated American cottons. This fact indicates that there is a closer relationship among the American species than between the American cottons in general and the Asiatic cottons.

When cotton plants first attracted the attention of civilized peoples, representatives of all the main groups were already in cultivation and probably had reached very nearly their present stage of development. Modern effort in the improvement of cotton, as of many other crop plants, has been largely a reworking of the materials bequeathed to us by the unknown plant breeders of the remote past.

Sea Island Cotton

Sea Island cotton seems to have been the first subject of intelligent breeding in modern times. It is supposed to have originated in South America and to have reached this country, by way of the West Indies, about 1786. It owes its name to the fact that it was grown in greatest perfection on the islands off the coast of South Carolina. Persistent selection by individual planters led to the production of lint measuring 2 inches or even longer, the longest and finest cotton ever grown anywhere. Only 1,000 to 2,000 bales of these choice strains, the so-called crop lots, were produced annually. European lace makers and manufacturers of fine sewing thread absorbed the product. The spread of the boll weevil to the Atlantic coast in 1916 and 1917 and economic disturbances after the World War put an end to the cultivation of this late-maturing cotton in our territory. It is now grown almost exclusively in some of the West Indian islands.

FIGURE 34.—A plant of the Acala variety of upland cotton, representing the Mexican-Central American group. (Photograph by H. F. Loomis)

The Sea Island planters gave extraordinary care to the growing, picking, and ginning of their fine cotton. They were probably the pioneers in practicing annual selection of a superior individual plant and increase of its seed to provide for the planting of future crops. To avoid seed mixture, a small hand gin was used on each plantation in ginning the selected seed. Individual planters were extremely jealous of their choice seed stocks, and the product of certain plantations sustained its high reputation year after year and was in continuous demand by particular European manufacturers.

FIGURE 35.—A plant of the Pima variety of Egyptian cotton, representing the South American group. (Photograph by H. F. Loomis)

Egyptian Cotton

Next to Sea Island cotton in length of lint, and hence in market

FIGURE 36.—Lint combed out on the seeds to show the range of length in commercial cottons. They are: 1. Sea Island. 2. Egyptian (Pima variety). 3. Long-staple upland. 4. Short-staple upland. 5. Asiatic. (Photograph by R. L. Taylor)

value of the product, are the Egyptian cottons. This type was developed in Egypt during the period 1820 to 1850. Like Sea Island, it clearly belongs to the South American group, but its parentage can only be guessed at. The first well-marked variety, Ashmuni, which is still grown in upper Egypt, had lint of a brownish color and about 1$\frac{3}{16}$ inches long. Numerous other varieties have since arisen. The most valuable of these, Sakellaridis or Sakel, has lint about 1½ inches long and much lighter in color than that of Ashmuni. Egyptian cottons, which constitute about 6 per cent of the world's crop, are greatly in demand among manufacturers of fine cottons. They are used largely for fancy dress goods, sewing thread, and fabrics for automobile tires and airplane wings.

Each of the varieties developed successively in Egypt appears to have originated with the selection by some cotton grower of a superior individual plant, the seed of which was increased and finally planted on a field scale. Formerly, few precautions were taken to keep the different varieties apart, and their uniformity was soon lost as a result of cross-pollination in the field and mixing of seeds at the gins. The work of selection and seed increase has been taken over recently by Government experts, and large supplies of relatively pure seed are now available for planting.

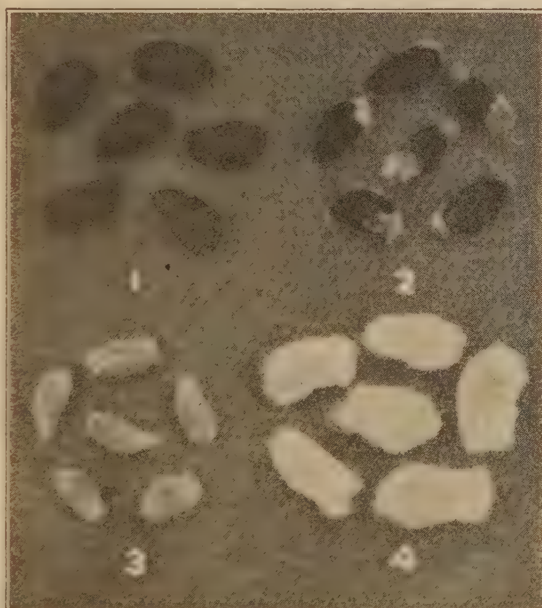

FIGURE 37—Seeds of various commercial cottons, with lint removed, showing differences in fuzziness. They are: (1) Rough Peruvian with seeds practically naked; (2) Sea Island with fuzz confined to the ends of the seed; (3) Asiatic, seeds covered with short greenish fuzz; and (4) American upland, seeds covered with long white fuzz. (Photograph by R. L. Taylor)

Seed of one of the Egyptian varieties was introduced into the United States by the Department of Agriculture some 30 years ago, and experimental plantings were made in various localities. The results showed that this kind of cotton grows best in the hotter parts of Arizona and California, where the climate is most similar to that of Egypt, and where, as in that country, the crop is grown under irrigation. A superior plant of distinctive type, selected in 1907 from the imported stock in Arizona, was the starting point of a new variety, called Yuma. In 1910 a single plant found growing in a field of Yuma cotton was selected because of its fruitfulness and the excellence of its lint, and from it was developed Pima, the only variety of the Egyptian type now grown commercially in the United States. (Figs. 35 and 38.) The lint of this variety averages about 1⅝ inches long. (Fig. 36.) The successive stages in the development of Pima cotton from its Egyptian ancestor are shown in Figure 39.

FIGURE 38.—Full-grown but unopen bolls of Acala upland cotton, representative of the Mexican-Central American group (lower), and of Pima Egyptian cotton, representative of the South American group (upper). The bolls of the first group usually have four or five locks or cells and are larger, much less pointed, and smoother than the bolls of the second group, which are prevailingly 3-celled. (Natural size.) (Photograph by H. F. Loomis)

Upland Cotton

Although less spectacular than the long-linted Sea Island and Egyptian cottons, upland cottons far outrank all other types in general utility. They constitute almost the entire crop of the United States and at least 60 per cent of the world supply. The original home of upland cotton probably was in Mexico or Central America, since forms similar in character to the cultivated upland varieties are found in that region growing wild or in a state of semidomestication by primitive tribes. History gives no clear indication of when and how these cottons first reached the territory that is now the United States. There is little doubt, however, that at the beginning of the nineteenth century most of the American crop was of the upland type.

FIGURE 39.—Lint combed out on seeds to show progressive improvement in the staple of Egyptian cotton after introduction into Arizona. (1) Mit Afifi as first introduced from Egypt; (2) the same after several years selection of the longest-linted individuals; (3) Yuma; (4) Pima

Selection by farmers of individual plants which caught their fancy soon gave rise to an enormous number of so-called varieties, many of which differed in little but name. In recent years the agricultural experiment stations of the Southern States and the United States Department of Agriculture, as well as private breeders, have been active in producing new varieties of upland cotton. A list compiled by the Department of Agriculture includes about 1,200 names of varieties, of which some 400 have been added during the last 10 years. The lint of

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upland cottons ranges from about three-fourths inch to 1$\frac{3}{16}$ inches in length, with a few "long-staple" varieties producing still longer lint. In one of these, Meade, the length averages 1$\frac{5}{8}$ inches and even reaches 1$\frac{7}{8}$ inches in special selections.

Several kinds of "big boll" upland cotton have been introduced in late years from Mexico and Central America by the United States Department of Agriculture. When first grown in this country these stocks showed much diversity, but selection of the best individual plants has led to the development of uniform varieties. One of these, Acala, is now the leading upland variety in the irrigated sections from western Texas to California and is grown without irrigation in central Texas and Oklahoma. (Figs. 34 and 38.)

Asiatic Cotton

The great bulk of the cotton produced in Asia is of the Asiatic type, which constitutes about 28 per cent of the total world crop. The lint of most Asiatic cottons is comparatively short and coarse, the staple usually not exceeding three-fourths of an inch. (Fig. 36.) There are numerous varieties, especially in India, where plant breeders in the Government service are engaged in the improvement of the local forms. The work of selection is being carried on also in China, Japan, and Russian Turkestan.

Methods Used by Cotton Breeders

The large and showy flower of the cotton plant is well adapted to both self-fertilization and cross-fertilization. Cotton is self-fertile and will "set" bolls even when the flower buds are inclosed so as to exclude insects, thus permitting pollen to be deposited only by automatic discharge at the base of the stigmas. To the breeder this is a desirable condition, since it enables him to develop uniform varieties by inbreeding. Fertilization is more nearly complete, however, and the yield of seed and lint is greater, when additional pollen is carried to the stigmas by bees and other insects. Most of the pollen deposited by insects comes from the same flower, but some of it is brought from flowers on other plants, resulting in cross-fertilization. The readiness with which the cotton flower can be cross-fertilized makes it possible to combine, by crossing, the best qualities of different forms, but, on the other hand, natural cross-pollination by insects is a constant threat to the uniformity of varieties.

In the improvement of cotton, as of other crop plants, there are two main lines of attack, (1) selection accompanied by inbreeding, and (2) cross-breeding or hybridization. Until lately, simple selection has been the only method used consciously in improving the cotton plant, although doubtless in many cases the plants selected have been natural hybrids. Cotton breeders have directed their efforts mainly to discovering the best individual plants among the mixed stocks which have come down from primitive times and to increasing the seed from such plants in order to establish more uniform varieties.

The method of selection differs only in minor details from that used by breeders of other crop plants. Starting, let us say, with a rather mixed population, such as is found in most fields, the breeder first picks out the individual plants that seem most typical, are most productive, and have the largest bolls and the most desirable habit of growth.

When the bolls open the plants are compared as to abundance of lint and its length, strength, and general quality. The choice thus is narrowed to such of the individuals selected on the basis of plant type as prove also to have superior lint. Seed from each of these individuals is saved and planted separately the year following.

When the progenies of the selected plants are examined the next summer, some of them are likely to show diversity in type of plant. These will be rejected without further consideration because of lack of uniformity. Others, although uniform, will be lacking in fertility or show an undesirable habit of growth. These also will be discarded promptly. In the fall the remaining progenies are compared as to character of lint, and only those that appear satisfactory as a whole are finally retained. The most desirable individuals in these progenies are selected, and their seed is saved for planting the second generation progenies. The process of selecting the best progeny, and the best individual plant in that progeny, is continued year after year until it becomes evident that no further progress is being made; in other words, that uniformity has been attained. Thereafter the problem is one of increasing the seed for planting on a field scale.

Where it is merely a question of improving an existing variety, more rapid progress usually can be made by selecting plants in the most uniform progenies, even though occasional individuals in less uniform progenies have superior lint. This is not to deny that an outstanding individual plant of conspicuous merit, wherever it occurs, should be considered as the possible source of a new and better variety.

Breeder Should Avoid Accidental Crossing

The cotton breeder must use the utmost vigilance to protect his selected stocks from becoming contaminated by accidental crossing with other kinds of cotton. In the breeding nursery the exclusion of pollen-carrying insects is effected by inclosing the flower buds in bags or wiring them before they open and by saving for planting only the seed produced by these strictly self-fertilized flowers. In fields grown for increase of seed, however, the labor and cost of thus treating a sufficient number of flowers would be prohibitive, and the only solution of the problem is to have the field located at a safe distance from any other kind of cotton. As an additional precaution, seed-increase fields should be inspected early in the season, in order to determine whether any contamination has resulted from accidental crossing the year before. If such proves to be the case, the field should be "rogued," which means that all plants appearing to be different from the selected type should be pulled up. "Off-type" plants, usually of a degenerate character, appear occasionally in inbred families, even when every conceivable precaution has been taken to protect them against accidental cross-pollination. Since the occurrence of such "rogues" can not be guarded against, it is obvious that even the most carefully isolated strain of cotton should be kept under close observation and rogued whenever necessary.

Heretofore, the deliberate creation of new types of cotton has scarcely been attempted, but interest is awakening in the possibilities of guarded cross-pollination as a means of getting new combinations of desirable characters. There is good reason to expect that this method will prove fruitful, especially when the forms to be crossed are not too distantly related. The cotton flower, because of its large size and the

accessibility of its reproductive parts, is easy to cross-pollinate. This is done by opening the bud and removing the stamens the evening before the flower is due to open naturally, thus preventing self-fertilization. The emasculated bud is then bagged to keep out insects, and the following morning its stigmas are dusted with pollen from the plant selected as the other parent of the cross.

Experience has shown that when crosses are made between two varieties of the same type, Egyptian, for example, it is possible to obtain a blend of the best qualities of both parents. The resulting new variety can be rendered "fixed" and uniform by selection in a few generations. But when very distinct types ot cotton, such as upland and Egyptian, are crossed, an entirely different condition is encountered. After the first generation the hybrid plants show immense diversity in all their characters and the great majority are unproductive or otherwise undesirable.

Reorganization of Cotton Production

The ancient Greek fable of the man who was condemned eternally to trundle a stone uphill only to see it come rolling down again aptly characterizes the work of the cotton breeder. Numberless excellent varieties have been originated in the breeding nursery, but, when placed in the hands of farmers, they have soon deteriorated and have had to be replaced by new ones. It came to be believed that some unknown law of nature determined the length of life of a variety of cotton and that it was bound to "run out," automatically, within a few years. There is, however, no real evidence that a variety can not be maintained indefinitely if the planting seed is kept pure.

Recently a beginning has been made in reorganizing cotton production on the basis of one-variety communities. This system was proposed by O. F. Cook as a means of avoiding the loss of uniformity due to cross-pollination in the field and mixing of seed at public gins, which occurs wherever two or more varieties are grown in the same neighborhood. If the system were generally adopted, the breeder of cotton would be inspired to redouble his efforts, since he might hope to see his creations perpetuated until replaced by something better, instead of disappearing a very few years after they begin to be grown agriculturally.

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COTTON Fabrics are the Most Suitable for Children's Wear There are no fabrics so suitable for children's wear as cotton. Variety of weave, texture, weight, and color makes it possible to use cotton for practically all garments from underwear to out-of-door play suits.

A happy child is one who is allowed to have free and unrestricted play. Silks, velvets, and fancy woolens are not intended for little folks who make mud pies and climb fences that have stray nails. They are made for the grown-ups. Children must have fabrics that are durable, comfortable, not easily wrinkled, resistant to dust, easily laundered, and never so expensive that an accidental tear becomes a crime. One can afford several outfits when cottons are chosen, and it is possible to have the frequent changes needed for comfort, cleanli-

ness, and health. Besides, those inevitable catastrophies are never so serious when a fresh supply of suits and dresses is always at hand. Play that is hampered by fancy clothes or a limited number of outfits robs a child of a part of his birthright which contributes to physical development and happiness.

The Bureau of Home Economics has designed several outfits for children such as rompers, sun suits, little girls' dresses, suits for the

FIGURE 40.—Cotton is the ideal fabric for the small boy as well as the girl

small boy, and out-of-door play suits. Cottons are used for practically all of these, not only because of the low expense, but because they are so well adapted to childhood needs.

Fabrics must be selected with use in mind. Cottons adapted to little girls' dress-up frocks would be entirely out of place for little boys' suits. A 1-year-old who is ready to wear his first rompers needs firm fabrics that have a smooth soft texture, light weight, durability, and fast

color. They must stand the wear and tear of scooting over the floor, and this means frequent tubbings that might well be called scrubbings. The new high-count chambray, ginghams, and broadcloths are durable; the smooth, close weave does not gather so much dirt; the colors are reasonably fast; the textures are comfortable for tender skins; and the firm weave makes it unnecessary to use starch. This does away with the scratchy seams that had to be endured by children of former years.

The sun suit has now come to be an accepted part of the summer wardrobe of the young child. Soft, open-weave materials such as marquisette and cable net make excellent tops because they admit the health-giving rays of the sun; and lawn, percale, gingham, poplin, and broadcloth may be used to complete the suits. These fabrics are fast to sunlight so that a child is free to play in strong light as long as he wishes without danger of having a faded suit.

Materials for Play Dresses

Little girls enjoy play dresses when they are fashioned from gaily printed lawn, gingham, and percale. The soft dainty texture of these fabrics makes them especially comfortable and adaptable to the designs which must always have fullness for free play. Dress-up frocks are attractive and practical when made of dotted Swiss, dimity, lawn, batiste, and voile. The daintiness of color and weave makes excessive trim unnecessary, and only enough to emphasize the beauty of the fabric is in good taste. Simple stitchery of color-fast cotton strand floss, bias binding, or contrasting fabric is usually sufficient. The fabric determines the trim.

Sturdier types of cotton satisfy the active small boys who must climb trees and turn somersaults. Many mothers have a mistaken fashion sense and dress their small lads in fragile fabrics that are not made for rough play. This is hard on a real boy and likely to prove costly. For hygienic reasons too, washable suits give most satisfaction the year round, and extra warmth can be provided by heavier underwear. Heavy cottons that are closely woven such as madras, gabardine, and galatea may be used for winter suits. In summer, blouses are comfortable if made of lightweight ginghams that harmonize with trousers of the new fine-ribbed piqué, poplin, or broadcloth. These fabrics have body enough to tailor neatly yet they are soft in texture.

Shower-proof and closely woven cottons are good for out-of-door play suits when the air is damp or cool. They may even be used as cover alls for the warm woolen suits needed for the freezing days when snowballs fly.

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COTTON-GIN Fires Frequent; Chief Cause Is Static Electricity An earnest effort has been made in recent years to develop some method of reducing the heavy fire losses in cotton gins. Some insurance companies have refused to carry insurance on cotton gins; others have limited the amount for which they will be liable; and in all cases the rates have been increased. Even with greatly increased rates the money paid on

claims in some sections has amounted to 500 per cent of the premiums collected. Any reduction in the fire loss which will result in lower insurance rates or make possible the carrying of additional insurance will benefit directly the cotton ginner and cotton grower. The tabulated data for the 5-year period from 1923 to 1927, as compiled by the National Board of Fire Underwriters, indicate an average annual payment of $2,078,606 on 1,584 claims against insurance companies. This figure is particularly significant in view of the small value of the average gin plant. No figures are available to indicate the losses from fires in uninsured gins or the claims paid by mutual insurance companies, but the amount of such losses would undoubtedly greatly increase the total.

In the statistics of the National Board of Fire Underwriters referred to, one-half of the total number of fires were ascribed to two of the known causes, namely, friction or sparks occasioned by running machinery, and smoking or matches. Eighty per cent of the remainder were listed as unknown. Undoubtedly, static electricity, included in the classification friction or sparks occasioned by running machinery, is the principal cause of fires during the ginning process.

FIGURE 41.—One of the hundreds of cotton gins annually destroyed by fire

Conditions Producing Static Electricity

In seasons when the largest number of fires in cotton gins have occurred, electrostatic charges have been abundant and troublesome. At such times the humidity was low, and cotton being ginned was particularly dry and dirty. During the periods when few fires occurred very little static electricity could be detected.

When humidity is low and cotton is both dry and dirty high charges of static electricity are common in the unloading and distributing systems, cleaners, and lint flues, and on saw and brush shafts, and practically all belts. These three conditions—low humidity, dry cotton, and dirty cotton—are essential for high electrostatic charges in the gin.

For the elimination of static electricity in cotton gins the grounding of machinery, as shown and described in United States Department of Agriculture Circular 76 C is recommended.

Fire-Packed Gin Bales

Fire-packed gin bales, that is, bales into which has passed some burning cotton ignited during the ginning process, cause serious losses.

It is recommended that immediately after a fire, the ginner plainly and conspicuously mark the bale that is tied out, regardless of the known or supposed condition of the bale. Some authorities suggest that these bales be identified by a red tag on which the month and day of ginning, as well as the gin is shown. This identification will serve as a warning to the compress yard weigher, the warehouseman, or the railroad agent that such a bale is a suspicious one and may contain fire. Bales so identified should be set aside where they will not endanger property or other cotton.

There has been considerable criticism, undoubtedly justified, of the general condition of the average American bale of cotton with respect to the fire hazard. It would seem that increasing the density of the bale, reducing its tendency to expand, and using a more closely woven burlap and more ties, would materially reduce the fire hazard in so far as the communication to and spread of fire among bales is concerned.

Fire Protection

In addition to the installation of a properly designed wiring system to eliminate static electricity and the precautions which should be taken to prevent smoking and the carrying of matches about a gin, adequate fire protection in a gin is of great importance. If a fire can be fought in its incipiency it can be readily put out, and little damage will result.

Fire-protection equipment in a gin may consist of water barrels, tanks, pumps, and pails; hose and standpipe connections to a water-pressure system; chemical extinguishers; and steam jets into gin stands, lint flue, cleaner, and pneumatic distributor. Interest is being shown in the use of carbon-dioxide gas as a substitute for steam for fighting cotton-gin fires, especially since internal-combustion engines and electric motors appear to be supplanting the steam engine as a source of power in ginning. Systems using carbon-dioxide or other inert gases have been developed for fire protection in other industries, and it may be possible to adapt this method of fire protection to cotton gins.

Cost of Inert Gas-Production Systems High

The principal objection to such installations at the present time is the cost of the equipment. To provide complete protection against fire in the lint flue at all times while the gin is running would require from 4,000 to 5,000 cubic feet of carbon-dioxide per minute in the average 4-stand gin. Unless a large supply of carbon-dioxide is readily obtainable near the gin at a low cost, protection of this type is not practical. Carbon-dioxide stored under pressure in steel tanks is available, with arrangements for releasing this gas automatically when a fire occurs. Since a number of fires may occur at a gin within a few hours a large reserve supply of gas is necessary to provide protection while any used tanks are being replaced. A 50 cent reduction in the insurance rate is allowed for such installations, and when the value of a plant or the amount of insurance carried justifies the expenditure the use of inert gas should be considered. The cost of an installation will vary according to the size of the plant.

Cotton-gin manufacturers are endeavoring to cut down the fire losses by constructing the machinery of metal as far as possible. The results are encouraging, and if the cotton ginner will install such equipment

in a metal building grounded to remove static electricity and take the necessary steps to maintain a clean plant and prevent smoking on the premises cotton-gin fire losses can be decidedly reduced.

HYLTON R. BROWN,
Engineer,
HARRY E. ROETHE,
Engineer,
Bureau of Chemistry and Soils.

COTTON Grade and Staple Estimates Show Quality Trend Public records have been kept since 1790 showing the number and the weights of the bales of cotton produced each year, but there have been no complete public figures showing the grade and staple of the cotton produced or consumed. In 1928, for the first time in the history of the industry, comprehensive figures were published showing the grade, staple, and tenderability of the cotton on hand at the end of the cotton year, July 31, and also for that year's crop. Figures were also published showing the number of bales of each grade and staple consumed by domestic mills during the preceding cotton year.

Quality is important to both growers and spinners. The cotton grower wishes to produce the cotton that will return to him the greatest net revenue. In the past, he has lacked information both as to the quality of the cotton he and other farmers were growing, and as to the grades and staples required by the spinners.

Spinners desire for use in their mills specific grades and staples, depending on the counts of yarn and the quality of the goods to be produced. This is especially true with respect to length of staple, because only within limits can one staple length be substituted for another. For certain uses, longer staples sometimes may be substituted for shorter, but it is not generally economical to do so. Staple length is, therefore, of special interest to the spinner.

Legislation Passed in 1927

In response to the demand for this information Congress, in 1927, passed legislation directing the Department of Agriculture to make an estimate of the grades and staple lengths of cotton carried over on August 1 of each year, and of the cotton as ginned during each crop year. Funds were made available for the fiscal year beginning July 1, 1928.

In carrying out the purposes of this measure, a representative portion of the 2,500,000 bales of cotton reported by the Bureau of the Census as on hand July 31, 1928, was classified according to the official cotton standards of the United States, and from this an estimate was made of the grade and staple length of all of the cotton reported as on hand. From these figures the number of bales tenderable on future contracts was calculated.

Of a total of 2,540,000 bales of cotton carried over to the next season, American upland constituted 2,400,000 bales, or a little over 95 per cent. Of these, all but 220,000 bales were tenderable on future contracts in accordance with section 5 of the United States cotton futures act.

More than 26 per cent of the American upland cotton in the carryover was 1 and 1/32 inches in staple length. The next most abundant

staple length was seven-eighths inch. In 1928 there was carried over more than twice as much cotton 1 3/16 inches or longer as of that which was shorter than seven-eighths inch.

The foreign cotton carried over in largest quantity was Egyptian, of which there were 65,000 bales. There were 45,000 bales of all other foreign cottons. The carry-over included practically no foreign cotton seven-eighths inch to 1 1/16 inches, the lengths produced in greatest abundance in the United States.

Estimates Released Periodically

Estimates of the grade and staple of cotton produced in the United States and in the several States were released periodically during the ginning season for the crop of 1928. These estimates were based on data obtained by the classification of samples secured from gins (fig. 42) distributed throughout the Cotton Belt in a manner calculated to give a cross section of the periodic ginnings of the crop.

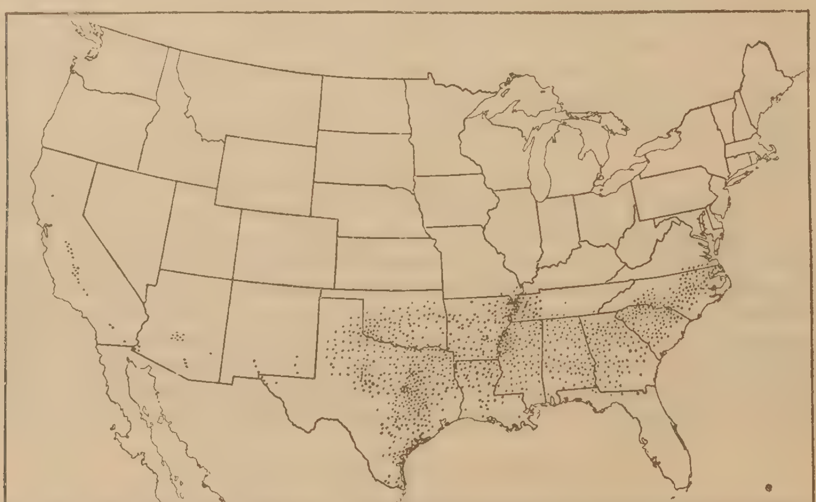

FIGURE 42.—Distribution of cooperating gins. Each dot represents a gin which cooperated by furnishing a sample of each bale ginned during the crop year 1928–29

American upland constituted all of the 14,290,000 running bales reported by the Bureau of the Census as having been ginned up to March 20, 1929, with the exception of 28,000 bales which were American Egyptian. In round numbers, 12,000,000 bales, or 86 per cent of the 1928 crop, were graded as White or Extra White and a little over 6,900,000 bales, or 48 per cent, were better than Middling in grade. The grade produced in the greatest abundance was Strict Middling, over 5,000,000 bales having been classified in this one grade. Only about 3 per cent, or about 490,000 bales, was untenderable on future contracts because of grade, although 1,790,000 bales were untenderable because the staple length was below seven-eighths inch, the shortest length tenderable under the law.

Preferred Lengths in the United States

In proportion to the quantity available, cotton 1 to 1 1/32 inches appears to have been a preferred staple length in the United States,

while the staple lengths apparently least desired are those shorter than seven-eighths inch. Last year's crop of American cotton, however, showed a production of almost 500,000 bales more of these very short staple lengths than of the lengths around 1 inch.

Although the supply of cotton in 1928 (fig. 43), that is to say, the total of cotton carried over on August 1 and of the crop of 1928, showed a preponderance of short staple lengths, it indicated a large supply of grades better than middling.

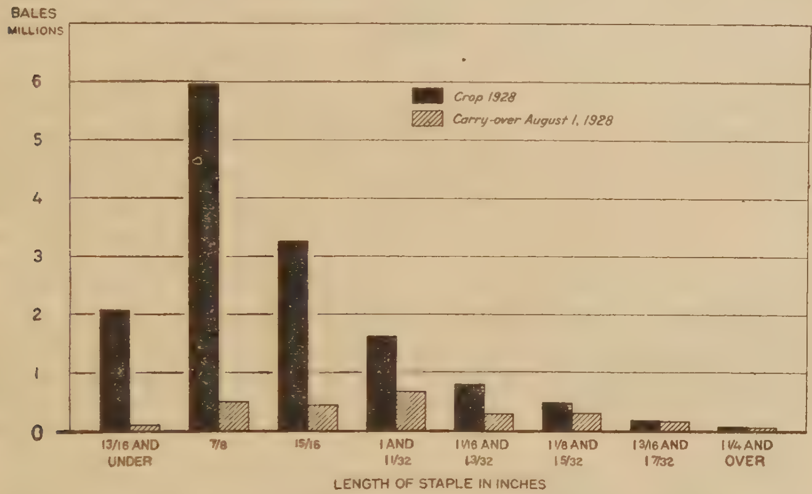

FIGURE 43.—Supply of American upland cotton in the United States, by staple length, 1928–29. The total supply of American upland cotton consists of that on hand at the beginning of the crop year, August 1, plus the current crop

Definite conclusions can not be drawn from data gathered in a single season, but the statistical picture of the quality of American cotton produced each year is of interest, and, together with similar reports covering the quality of cotton consumed in American mills, should be of increasing value as the data accumulate.

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COTTON Insect Control Measures Should Fit Into the Farm Scheme To appreciate the insect problems involved in cotton production in the United States, it must be remembered that the cotton crop is produced over a region extending 2,000 miles from east to west and 600 miles from north to south. Within this region we find almost every conceivable type of climate, soil, and other conditions influencing the activity of insects. Temperature and rainfall are especially important in their influence on insect activity and it will be noted that the areas of cotton production range from the irrigated districts, with a rainfall of 10 inches or less a year, to other districts of extreme humidity with a yearly rainfall of approximately 60 inches. Consequently the insect problems vary tremendously in different sections and are further complicated by the effect of other crops from which some pests transfer

their attention to cotton. Some sections may have little or no insect damage; others may be afflicted with only one predominant pest; while still others suffer from a complication of overlapping injury caused by a half dozen or more of different pests.

As has been the case with most other crops, the insects attacking cotton have steadily increased in recent years and have already reached the point where in most parts of the Cotton Belt they are a dominant factor in the problem of production. In many sections they have already revolutionized cultural methods and affected land values, and in some cases have completely changed the economic structure of the community. These changes are still under way, and one of the principal problems of the cotton farmer to-day is that of fitting the various insect-control measures into his scheme of farming so that he may reap the maximum benefit from them with a minimum of cost and disruption of his regular farm practices. Fortunately, fairly effective control measures are available for most of the principal pests and these are being improved constantly. However, they require more or less expenditure of money and particularly demand a greater degree of supervision and intelligent planning of farm operations than was the case before these insects became so prevalent and injurious. Insects, as a whole, have served to place a premium on good farm practices that tend to increase the yield of cotton in the absence of insects, since the cost per acre of insect control is practically the same regardless of the productiveness of the crop in question. Therefore the most profitable solution consists of insect control combined with increased production per acre.

Any attempt to deal with even the major pests of cotton in a comprehensive way is beyond the scope of the present article, and in the following pages only some of the more important problems are considered.

The Boll Weevil

By far the most important pest of cotton is, of course, the boll weevil, which entered this country from Mexico more than 35 years ago and now covers more than 90 per cent of the cotton area. Fortunately, the boll weevil thrives only in fairly moist regions, so there are many sections where the weevils either can not survive at all or are able to live only in limited numbers and do practically no damage to the crop. The extent of the damage in the United States as a whole can be seen from Table 2.

TABLE 2.—*Boll weevil damage to cotton in the United States, as estimated by the Bureau of Agricultural Economics, 1910–1928*

Year	Annual loss of cotton (in terms of weighted average percentage of the estimated crop in absence of the boll weevil)	Year	Annual loss of cotton (in terms of weighted average percentage of the estimated crop in absence of the boll weevil)	Year	Annual loss of cotton (in terms of weighted average percentage of the estimated crop in absence of the boll weevil)	Year	Annual loss of cotton (in terms of weighted average percentage of the estimated crop in absence of the boll weevil)
1910	5.30	1915	9.93	1920	19.95	1925	3.87
1911	1.28	1916	13.36	1921	30.98	1926	7.04
1912	3.26	1917	9.34	1922	24.17	1927	18.50
1913	6.69	1918	5.83	1923	19.55	1928	14.10
1914	5.91	1919	13.20	1924	8.01		

It should be noted in considering this table that during the years 1910 to 1920 the weevils were still spreading across the Cotton Belt and it was not until the end of this period that they had reached their maximum extent of infestation. Consequently, the figures since 1920 are more significant than the earlier ones and represent the annual fluctuation in damage as influenced by seasonal climatic conditions. Generally speaking, a dry summer means light weevil damage and a wet summer means heavy loss due to weevils. Indirect control measures have been evolved, all tending to increase the productiveness of the crop and hasten maturity of as much cotton as possible before the weevils become abundant. In addition, the use of calcium-arsenate dust has now become very widespread and is an effective and profitable means of control, especially under the conditions of most heavy infestation. While dusting has been practiced commercially for a number of years, it is still in the developmental stage, and improved methods are increasing its effectiveness and decreasing its cost from year to year.

The Cotton Leaf Worm

Probably the oldest known pest of cotton in the United States is the cotton leaf worm, or so-called cotton caterpillar, which has been recorded as occasionally damaging cotton since the earliest days of its production in this country. This species is peculiar in that it does not pass the entire year in the United States. It is active here during the summer months and dies out during the winter, and the infestations are due to reinvasion by moths coming in from either Central or South America. For many years these invasions occurred in approximately 21-year cycles, but something has happened to upset the conditions influencing these cycles and invasions have been intermittent and much more frequent during the past decade.

These invasions are usually characterized by infestations starting along the Gulf coast of southern Texas, some time during the early or midseason period, and then spreading over more or less of the remainder of the Cotton Belt as the season progresses. The degree of damage depends entirely on the rapidity of spread and abundance of the worms. Fortunately, these worms are very readily controlled by poisoning, but the greatest problem lies in forecasting outbreaks long enough in advance to permit growers to secure an adequate supply of poison and machinery for applying it in the threatened districts, since damage develops very rapidly once an infestation appears and the poison applications frequently must be made within a few days after the first worms are noticed.

This cotton leaf-worm problem is assuming an entirely new aspect owing to the extensive use of poison in the Gulf coast region of Texas where the first individuals usually land. Much of this territory is now treated with poison practically every year for boll-weevil control and this same poisoning likewise serves to control the leaf worm. In addition there are now available for service several companies doing airplane dusting in that territory, and when a leaf-worm infestation starts, they are able to treat large areas on comparatively short notice. In 1929, for example, infestation started in southern Texas earlier than in any previous season for which there is a record, and normally at least the greater part of Texas and a portion of Louisiana would have been infested by the end of the third generation. During that season, however, poisoning for these worms was so general in the area infested

by the initial invasion that the spread was greatly retarded and comparatively few counties were infested at the time of maturity of the crop in that region. This crop maturity, however, was accompanied by rainy weather which permitted leaf-worm multiplication, and as a result the next two generations spread very rapidly, reaching at least as far eastward as Mississippi. Fortunately, most of this spread arrived after the crop was fairly well matured and thus caused little or no loss. But for the extensive poisoning practiced in southern Texas during the early months, these worms would have spread to the north and east through the adjoining States from one to two months earlier than they did.

The Cotton Bollworm

The cotton bollworm, or corn ear worm, is another old pest of cotton. It occurs throughout the Cotton Belt but causes severe injury, as a rule, only in Texas and Oklahoma. Even in those States its damage is very sporadic, though the tendency during the last few years, especially in central Texas, has been toward an increase in damage, possibly due to changed farm practices. Through most of the Cotton Belt this pest always takes a small share of the crop, but usually not enough to warrant an effort at direct control. Furthermore, even in the areas of greatest damage, the erratic occurrence of the outbreaks has always rendered control very difficult. The farmer suffering severe loss one year may take all precautions for control the next year and then find practically no worms in his crop. Control measures are usually associated with cultural practices, though cases of extreme infestation have warranted direct control by poisoning. The increased severity of damage during recent years has rendered it necessary for the Department of Agriculture to undertake a review of control measures in conjunction with present farm practices in the effort to reduce the losses.

The Cotton Louse

The cotton louse or aphid occurs throughout the Cotton Belt but is usually not looked upon as a major pest. During a period of cool nights in the early spring the infestation on seedling cotton may become severe enough to cause some loss of stand and retardation of growth of the surviving plants, but the damage is seldom sufficient to justify any effort at control. Damage to older cotton has usually been rather rare until within comparatively recent years. During the last decade or more there has apparently been a rather definite trend toward increased abundance, especially in dry seasons. This is further complicated by the fact that the use of calcium-arsenate dust for boll-weevil control is occasionally accompanied by increased louse infestation. Consequently there has been a steady growth of interest in control measures, although it has been found that even comparatively severe louse infestations on cotton during the late seasons caused relatively little loss of crop. Control can be readily secured by the use of nicotine dust when necessary, and where weevil poisoning is being practiced, control of the two pests is accomplished by the addition of nicotine to the calcium arsenate.

The Cotton Flea Hopper and Related Species

The most important cotton insect development of recent years has been the spread of "flea-hopper" damage over the Cotton Belt.

This was first recognized about 10 years ago in southern Texas but did not attract general attention until 1926, when it served to retard greatly the setting of fruit over most of the Gulf States and extended as far eastward as South Carolina. This problem is still under investigation; it has been found, however, that the damage is caused by any one of several insects occurring in different sections of the Cotton Belt, and in some localities two or three different species may collaborate to produce the damage. The exact nature of the injury is still unknown; it results primarily in the shedding of the young fruit of the plants and extreme deformity of the vegetative growth. The problem is a very complicated one, involving as it does a number of different species of insects having different life cycles, and is also influenced by the seasonal history of the different alternate host plants found in various sections. So far, the best results in cases of severe infestation have come from the use of sulphur dust applied to the plants in much the same manner as calcium arsenate is used for the boll weevil. Fortunately, this damage usually does not continue throughout the season and a good crop of cotton may still be produced after the hopper damage has ceased, provided the other insect pests have not become so abundant that they prevent the setting of fruit. Hopper damage is therefore of primary importance in its relation to the activity of other insects which may increase in abundance, during the period when the hoppers are preventing the setting of fruit, to the point where they will in turn prevent the setting of fruit after the hoppers have ceased their activity.

Other Less Widespread Insects

In addition to the foregoing major pests, there are numerous others of more or less localized importance.

The Arizona wild-cotton weevil, for example, a very close relative of the boll weevil, is found occurring in the mountain ranges of Arizona and northern Mexico on Thurberia, a native wild-cotton plant. A few years ago this weevil transferred its attention to some of the near-by plantings of cultivated cotton and since that time a constant fight has been in progress to prevent the further spread of this species. This pest is primarily a menace to the western areas of cotton production where conditions have been too dry for the ordinary boll weevil to thrive but where this species seems to multiply without difficulty.

The cotton leaf perforator is known to occur in California and eastward as far as southern Texas, principally in the irrigated districts. This is another case where the outbreaks are very sporadic, and so far severe damage has occurred only in the Imperial Valley of southern California.

The red spider of cotton has attracted attention mainly in the Southeastern States, but occasionally, especially after periods of prolonged drought, it causes considerable damage as far west as the Mississippi Valley. Fortunately this pest is comparatively easily controlled by cleaning up other host plants and by applying sulphur.

Practically every season alarming reports come in from some districts of the Cotton Belt regarding activities of the cotton square borer, but this insect usually causes much more alarm than actual damage, as natural control by other insects practically always eliminates it as a factor just when it appears to be most threatening.

In addition, there are innumerable other pests of cotton, such as grasshoppers, cutworms, and plant bugs, any of which may become locally abundant but which seldom or never assume major widespread importance. In the aggregate, in the Cotton Belt as a whole, these species take an important toll every season. Fortunately many of them are more or less automatically controlled by the poisons and other control measures being utilized for pests of graver importance.

The cotton farmer of to-day can not possibly ignore the problem of insect control in his production program, and the most profitable crops of cotton can only be expected when he has made intelligent application of the best known control measures to his particular set of insect problems.

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Principal Entomologist, Bureau of Entomology.

COTTON of Long Staple Could be Produced in Much Greater Quantity A greatly increased production of long-staple cottons is possible in the United States to meet the requirements of new developments in the automobile and aircraft industries, where the highest possible combinations of strength and lightness of material are required. The rapid growth of these new industries calls for a home production of high-quality fiber. The supplies of long-staple cotton from Egypt and other foreign countries are becoming inadequate and precarious, and we take needless risks in depending upon importations of essential raw materials which our own farmers would produce if suitable adjustments of the marketing system were made.

Superior varieties of long-staple upland cotton are now available, as early and productive as varieties with less than an inch staple. Such varieties are now replacing the older, late-maturing, "Peeler" varieties formerly grown in the Yazoo Delta and neighboring regions of Mississippi, Louisiana, and Texas, and can be produced in many other districts. Probably 2,000,000 to 3,000,000 bales could be supplied, with staple from 1⅛ to 1⅜ inches, if the uses of such cotton were developed. All of the field operations—preparing, planting, and cultivating—are the same for growing inferior cotton as for producing good fiber. The popular notion that high yields are to be obtained only from varieties with very short staple is incorrect.

Sea Island and Egyptian Long Staples

The finest long staple in the world, some of it 2 inches or more in length, was produced formerly in South Carolina, on the Sea Islands near Charleston, which also supplied seed to Georgia and Florida. A total production of 100,000 bales of Sea Island cotton was attained in favorable seasons before the weevil period. Experiments are now being made to determine the possibility of reestablishing the production of this cotton in South Carolina and neighboring States in separate communities, away from upland cotton.

A limited production of the Pima variety of Egyptian cotton has continued in the Salt River Valley of Arizona since 1912. The crop of 1928 was about 30,000 bales, while 200,000 to 300,000 bales of Egyp-

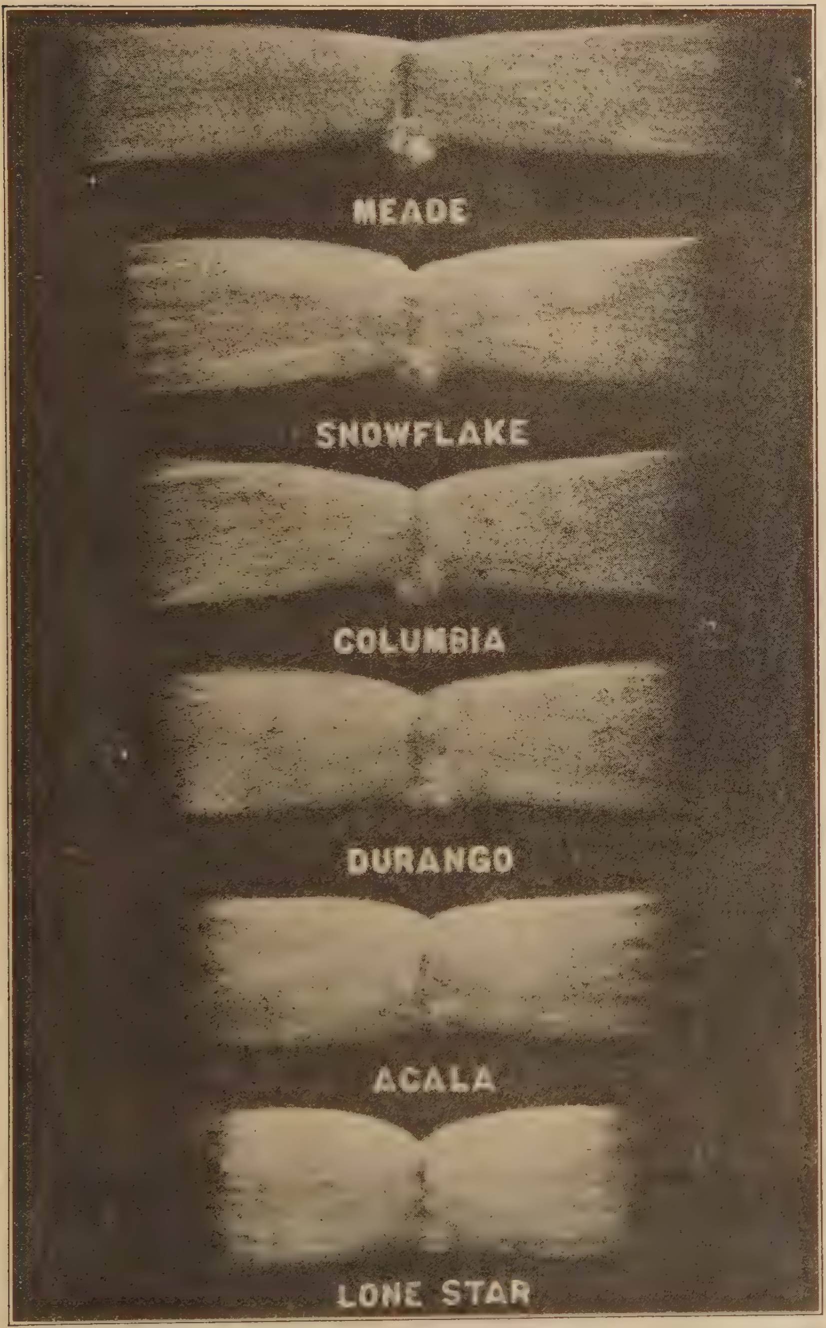

FIGURE 44.—Combed samples of premium and long-staple upland cottons produced in the United States. (Natural size)

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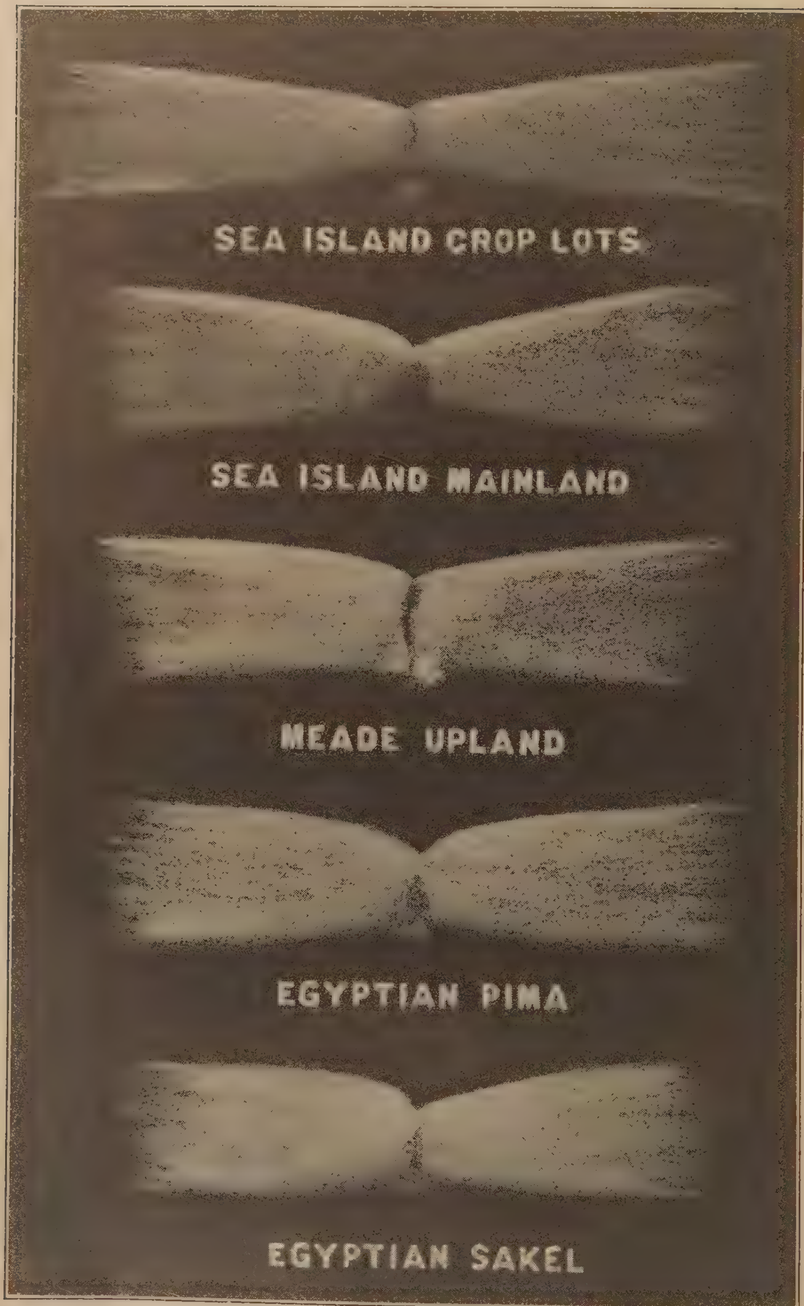

FIGURE 45.—Combed samples of extra-long staple cottons produced in the United States. (Natural size)

tian cotton were imported. A half million bales of Egyptian and Sea Island cotton probably could be grown and used in the United States if production and marketing could be stabilized.

Medium-length upland staples, from 1⅛ to 1¼ inches, can be grown over a large part of the Cotton Belt under any conditions where the plants have regular supplies of moisture. The nature of the soil determines very largely the rainfall requirements or the frequency of irrigation. Favorable and unfavorable soil conditions may be found in the same neighborhood, or even in parts of the same field, which render the fiber very irregular, unless precautions are taken for separate handling of the cotton from the good and bad areas.

Poor Fiber a Cause of Loss

The lives of millions of people in the United States are applied to producing, manufacturing, and selling cotton, and all of these activities are less effective because the fiber is inferior; and the consuming public has less satisfaction. The wastes from using poor fiber are enormous. The improvement of the staple is the key to the general improvement of the industry.

The commercial system undoubtedly is responsible for the limited production of fiber of good quality in the United States. Efforts to improve the quality of the cotton fiber are seriously handicapped by the methods of buying the cotton from the farmers at "flat prices," without adequate discrimination of quality in the primary markets.

FIGURE 46.—Pulled samples of extra staple cotton, same series of varieties as in Figure 45. (Natural size)

Statistics collected recently by the Bureau of Agricultural Economics indicate that 79 per cent of the crop of American upland cotton in 1928 was under 1 inch in length, while less than 5 per cent

attained $1\frac{1}{8}$ and less than 1 per cent $1\frac{1}{4}$ inches. Nearly 18 per cent of the crop, or 2,500,000 bales, was not tenderable in the futures market on account of the fiber being less than seven-eighths of an inch in length. Thus the disregard of quality has been carried to an extreme, and the fiber in many districts has declined to a footing of competition with the shortest and cheapest cottons, from India and China. Markets for good cotton are not supplied, while a large surplus of inferior cotton must be carried over. In the last few seasons millions of dollars have been lost in loans to producers of inferior fiber, so that bankers and financial leaders are beginning to see the need of being interested in the quality of the seed that their clients plant. Subsidizing the incompetent farmers does not make for improvement of production.

FIGURE 47.—Experimental field of Sea Island cotton, Wadmalaw Island, near Charleston, S. C., August, 1929

Community Production of Long Staples

Cooperative marketing is considered to afford the best outlook to the solution of the general problem of placing farm life on a footing of economic equality with urban activities, and in the cotton industry the cooperative relations should begin with the improvement of production. The best outlook for developing a sustained and successful production of long-staple cotton seems to be in organized progressive communities where marketing improvements can be applied as well as improvements of production. Farmers do not become interested in improved varieties and methods except as the better quality of the fiber is reflected in a higher price. Improvements of production and of the commercial system must go together, since there is little prospect that either undertaking can be carried forward without the other; but both lines of improvement are combined naturally and constructively in communities that unite upon the growing of a single superior variety.

The primary advantage in growing one variety exclusively is that the selection and isolation of the seed stocks can be maintained and all of the farmers of the community supplied with seed of the same high quality. Cultural methods are improved because it is plain in 1-variety communities that differences in the behavior of the crop are due to conditions of growth, not to differences in varieties. A farmer whose crop is poor learns to correct his mistakes instead of relying on the false notion of "changing the seed." The next crop is placed on better land or grown more carefully, and the community product is gradually made more uniform.

A continued production of the same quality of fiber places a community in a few years on a different footing in the marketing of its cotton. Competent buyers are attracted to the communities that produce commercial quantities of good fiber, and manufacturers are interested in obtaining regular supplies of the same cotton from year to year. Premiums that manufacturers have paid for the longer staples have fluctuated greatly in the past, chiefly on account of the limited and irregular supplies. The experiment of a properly adjusted production and use of long staples has never been tried, and is one of the problems that may be worked out by cooperative contacts between associations of manufacturers and communities of growers.

Conscious Community Interest Necessary

A cooperative relation is established among the members of a community by the planting of a single variety of cotton; but a conscious community interest must exist, as well as a desire to grow better cotton, if the 1-variety community is to function as a constructive organization and obtain the full advantage of growing better fiber. Cooperation has its problems that need to be studied, no less than tillage, cultivation, and seed breeding. One writer has said that cooperation is the seed of community life. This applies especially to the cotton industry, because community cooperation is required for the basic improvement of production through maintaining supplies of pure seed.

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CREAM-Gathering Routes for Local Creameries Coming Into Wider Use

Cream-gathering routes for local creameries have been used to some extent for many years. Since the motor truck has come into general use and country roads have been improved, this method of getting cream from the farms to the creamery is being more widely adopted.

A study made by the Bureau of Dairy Industry of cream-gathering routes revealed that at some plants the advantages of this method of hauling greatly outweigh the disadvantages, while at others the reverse is true. Where the producers bring sweet cream direct from the farms to the creamery, deterioration in quality in transit usually is very slight. Employing trucks to gather cream would cause much of it to be en route a longer time, with the result that the cream would be of poorer quality when it arrived at the creamery. On the other hand, where the producers bring their cream to the creamery only

once or twice a week as suits their convenience, the use of trucks to gather it three or four times a week will result in the creamery receiving a better-quality product. At some creameries the establishment of cream-gathering routes has resulted in improving the quality of the butter to such an extent that the increased price received for it more than paid the cost of gathering the cream.

Where cream is bought according to grade, cream-gathering routes may enable more patrons to deliver first-grade cream. In order that each patron's cream may be weighed, sampled, and graded after arrival at the creamery, the cream should be delivered in the patrons' cans.

By using cream-gathering routes the creamery management controls the day of delivery, the time of delivery, and the care of the cream while in transit. By having large loads of cream arrive at certain hours, the receiving and processing of the cream can be done more efficiently than when producers are delivering cream at all hours of the day. Cream-gathering routes may also increase the volume of cream procured by the creamery. New patrons may be obtained in near-by sections because of the service given them, and in more distant communities by extending the routes.

Creamery Management Should Control Details

All details of operating cream-gathering routes should be controlled entirely by the creamery management. In some communities persons not employed by the creamery have organized their own cream routes and fixed their own charges for hauling. Where this is done undesirable features usually develop. Cream haulers compete with one another for the same cream, they may invade the territory of a neighboring creamery and thus cause strife, or they may divert their load of cream to another creamery. These things can not occur where the routes are planned by the creamery management and the haulers are hired to cover a definite route.

The selection of suitable haulers is important because they become the creamery's point of contact with the producers. A conscientious hauler of good personality with the interest of the creamery at heart can aid in establishing among the producers confidence in the creamery management.

The main factor that determines whether or not it is advisable for a creamery to establish cream-gathering routes is cost. As cream is paid for on a basis of its butterfat content, the hauling cost is best expressed as the cost per pound of butterfat. When a producer hauls his cream to a creamery and attends to other business on the same trip, the cost of transporting the cream is small. When trips are made exclusively for carrying cream the cost of hauling is likely to be greater than the cost of delivery by cream-gathering routes. The cost per pound of butterfat of operating a cream-gathering route can be estimated quite closely by obtaining the following data: Number of miles to be traveled, pounds of butterfat to be obtained, wage rate for truck drivers, and cost per mile of operating the truck. This last item can be obtained from the manufacturer of the truck to be used. If the cost of hauling is $10 per trip and only 100 pounds of butterfat can be obtained the cost will be 10 cents per pound of butterfat, which is more

than the service is worth either to the producer or to the creamery. If, however, 500 pounds of butterfat were obtained on this trip, the cost would be but 2 cents per pound of butterfat, which is less than the cost to the average producer when he makes a special trip to deliver his cream. In a study of cream hauling by the Bureau of Dairy Industry at 8 middle-western creameries the relationship between the cost of hauling and the number of pounds of butterfat obtained per mile was determined, as shown in Table 3.

TABLE 3.—*Data on cream hauling obtained at eight middle-western creameries*

Creamery No.	Average patrons per trip	Average miles per trip	Quantity of butterfat hauled per trip	Average distance between patrons	Average butterfat per patron	Average butterfat collected per mile traveled	Cost per pound of butterfat
	Number	*Number*	*Pounds*	*Miles*	*Pounds*	*Pounds*	*Cents*
1	33.7	41.7	280	1.23	8.3	6.7	2.66
2	40.2	37.4	340	.93	8.5	9.1	2.41
3	39.4	35.5	327	.90	8.3	9.2	2.05
4	56.5	53.1	464	.94	8.2	8.9	2.18
5	44.7	36.9	645	.82	14.4	17.7	1.08
6	26.2	19.9	418	.76	16.0	20.9	1.05
7	21.5	23.5	205	1.09	9.5	8.7	2.20
8	29.0	28.1	227	.97	7.8	8.1	1.83
Average	36.6	34.7	377	.95	10.3	10.88	1.72

It is obvious that the cost of hauling would be relatively high in a section having patrons far apart and owning but few cows, thus producing but a small amount of butterfat per mile.

Employment of Truck Owners Proves Cheapest Method

Of the eight plants listed in Table 3, three owned the trucks used on the routes and hired drivers by the month. The remaining five employed men who owned trucks and paid these men, in a few cases, by the trip, but usually according to the pounds of butterfat hauled. It has been the experience of many plants that cream may be gathered at the least expense by employing men who own trucks to cover routes laid out by the creamery management.

Short routes are preferable to long ones because of the shorter length of time the cream is in transit. In order to have short routes and to arrange that all the cream reaches the plant early in the day, cream gathering provides employment for only a part of the day. Many creameries, therefore, employ farmers as cream haulers. A farmer living at some distance from the creamery can gather the cream in the territory between his farm and the creamery, deliver it, and then return to his work on the farm. Creameries operating their own trucks usually arrange their routes to provide full-time employment for trucks and drivers. The operation of a number of trucks by a creamery demands as careful managerial supervision as the operation of the creamery.

C. S. TRIMBLE,
Associate Dairy Manufacturing Specialist,
Bureau of Dairy Industry.

CREAM Grading Enables Creameries to Improve Quality of Their Butter A cooperative creamery in a Southern State had been in operation for several years before an effort was made to get the farmers to care for their cream and deliver it frequently. The same price per pound of butterfat was paid for all cream regardless of age, acidity, or degree of fermentation. Although the best manufacturing methods were used the butter was always of low grade, consequently the price paid for butterfat was low.

Upon the advice of State and Federal dairy specialists a program of cream improvement was adopted. For several months methods of cooling and caring for cream and of cleaning dairy utensils were explained to farmers at the creamery, at schoolhouse meetings, and at their homes. A cream-cooling tank was set up outside the creamery as a continuous demonstration of how the farmers should cool and store their cream. Each patron's cream was occasionally scored and criticized and a copy of the score card sent to him.

Grading System Established

All of this was but preliminary to establishing a grading system and paying for cream according to grade, which became effective in the spring of 1925. Three grades of cream were adopted, as follows: Premium cream, containing not to exceed 0.2 per cent acid and clean in flavor; grade 1 cream, containing 0.21 to 0.4 per cent acid and clean in flavor; grade 2 cream, containing more than 0.4 per cent acid or having undesirable flavor. The price for butterfat in premium and grade 1 cream was fixed at 3 cents a pound higher than that in grade 2. The effect of this price differential on the quality of cream received at the creamery is shown in Table 4.

TABLE 4.—*Percentage of premium and grade 1 cream received at creamery as result of price differential for butterfat*

Year	Premium and grade 1 cream received	Year	Premium and grade 1 cream received
	Per cent		*Per cent*
1923	0.00	1926	66.26
1924	10.00	1927	65.06
1925	62.67	1928	70.30

Not only was the quantity of premium and grade 1 cream increased but the quality of all other cream was so greatly improved that the butter made from the grade 2 cream is now of better quality than the entire output before grading was started.

The improvement in the quality of cream has naturally resulted in higher prices for the butter, as shown by Table 5.

TABLE 5.—*Difference between price per pound for 90 score centralized car lots of butter in Chicago and that received at the creamery*

Year	Cents	Year	Cents
1923	−2.88	1926	−0.50
1924	−1.90	1927	−.58
1925	−.41	1928	+.16

In 1928 this creamery received 3.04 cents per pound more for its butter, in relation to the market price, than in 1923, before cream grading was adopted. As the creamery in 1928 made 181,900 pounds

of butter, it received $5,529.76 more than it would have received if the butter had been of the same quality as that made in 1923.

Butter Quality Materially Improved

Another creamery, located in the same section of the State and making about 300,000 pounds of butter per year, is following the leadership of its neighbor, with the result that about one-third of its cream is premium and grade 1, and the quality of its butter has been materially improved.

In a near-by county a cooperative creamery was established in 1928 and started grading January 1, 1929, using the same grades and price difference as mentioned above. Although this had always been sour-cream territory, that creamery received as much as 50 per cent premium and grade 1 cream during the spring of 1929.

These are examples of effective methods of improving the quality of creamery butter. Many creameries that are now manufacturing low-grade butter can make a material improvement in quality by adopting a grading system and paying for cream on a basis of the grade of butter that can be made from it.

WILLIAM WHITE,
Senior Dairy Manufacturing Specialist,
Bureau of Dairy Industry.

DAIRY and Beef Cows' Udders Differ; Skeleton and Other Organs Similar One glance at a dairy cow and a beef cow reveals great differences in their conformation. These differences have been emphasized so often that the tendency has been to imply that they are greater than can be accounted for by the difference in fleshing and that they must extend to the anatomical and skeletal structure of the animal. Not long ago, Sophie Nineteenth, of Hood Farm, a Jersey cow which at one time held the world's yearly record of production of butterfat, and Blackbird of Dallas, an Aberdeen Angus cow that had been successful in show-ring competition, were obtained and slaughtered for the purpose of determining the fundamental differences between the two types. Their external conformation, internal anatomy, mammary development, and skeletal structure were studied in detail.

In order to determine the differences in external conformation, it was necessary to make body measurements. In addition to the body measurements, which were taken with calipers and tape line, cross-section outlines, or contours, of the fore chest and paunch were made for both cows. (Figs. 48 and 49.) Contours are much more significant than caliper measurements of the same body parts because one cow may have exactly the same depth and width as another yet, because of differences in outline, the two cows may differ greatly in contour. A striking difference between the two cows is shown by these contours. The contour area of the fore chest of Blackbird was more than twice that of Sophie and the area of the paunch was more than one and one-half times as much.

Although Sophie weighed 638 pounds less than Blackbird at the time measurements were obtained, she was more than 6 centimeters taller at the withers, of almost the same height at hips, and more than 2 centimeters lower at the pin bones. The total length of Blackbird from withers to pin bones was 95.8 per cent as great as that of Sophie. The three body circumferences showed greater size for Blackbird. Sophie

had a longer but narrower head. In proportion to her width, she also was much deeper than Blackbird in the fore chest and slightly deeper in the paunch. The volume of barrel was about 70 per cent greater and the body-surface area about 20 per cent greater for Blackbird, whereas the legginess, or proportion of leg length to total height, was about 15 per cent greater for Sophie.

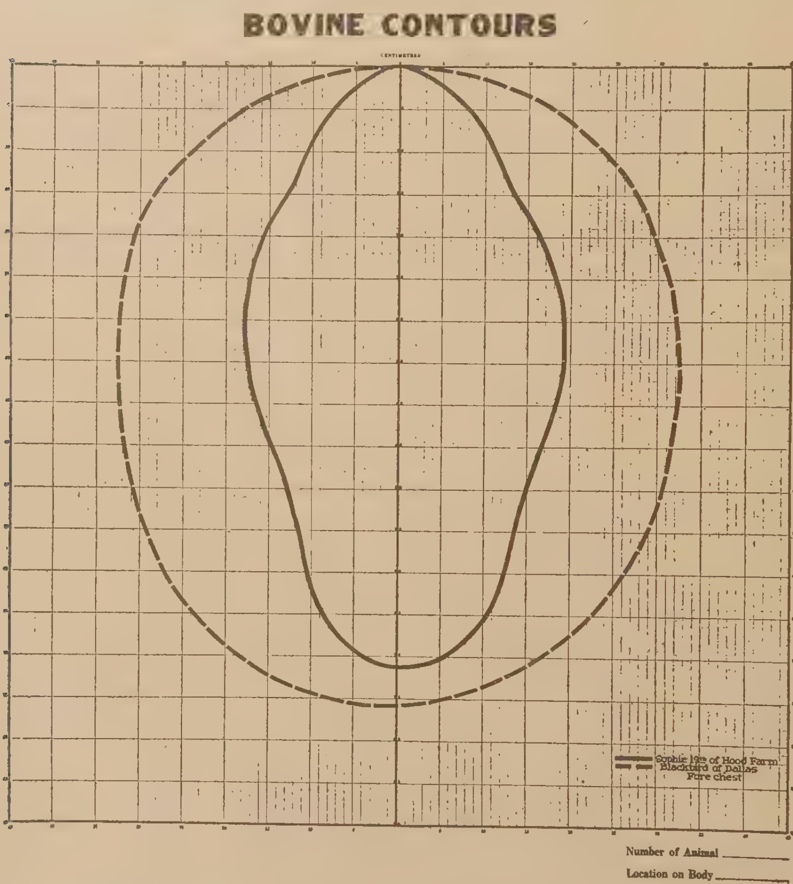

FIGURE 48.—Contours of fore chests of Sophie and Blackbird

Differences In Tapering

The body measurements and contours consistently show that Sophie was decidedly tapering laterally from front to rear but that she had almost equal depth of fore chest and paunch. Blackbird, on the contrary, did not taper very much laterally from front to rear but she did show a decidedly greater depth in paunch than in fore chest. It is somewhat contrary to one's expectations to find a greater vertical wedge shape in a beef cow than in a dairy cow.

Although the differences in conformation were great, the organs of the two cows were similar in size. The weights of kidneys and adrenals were greater for Blackbird than for Sophie. The spleen weights were almost identical. The weights of empty stomachs and empty intestines were less for Blackbird than for Sophie. Intestine lengths of

166.5 feet for Sophie and 181.71 feet for Blackbird are of interest because of their relative similarity and because these values are intermediate and do not even approach the maximum or the minimum intestine lengths recorded in the post-mortem study of a large number of cows. An accurate weight of Sophie's lungs could not be obtained because of blood retention. Blackbird's lungs weighed 5.85 pounds, which is relatively low on the basis of the average lung weights of 229 cows slaughtered in a packing house. The heart weights were almost identical and the heart circumferences were similar. The weight of

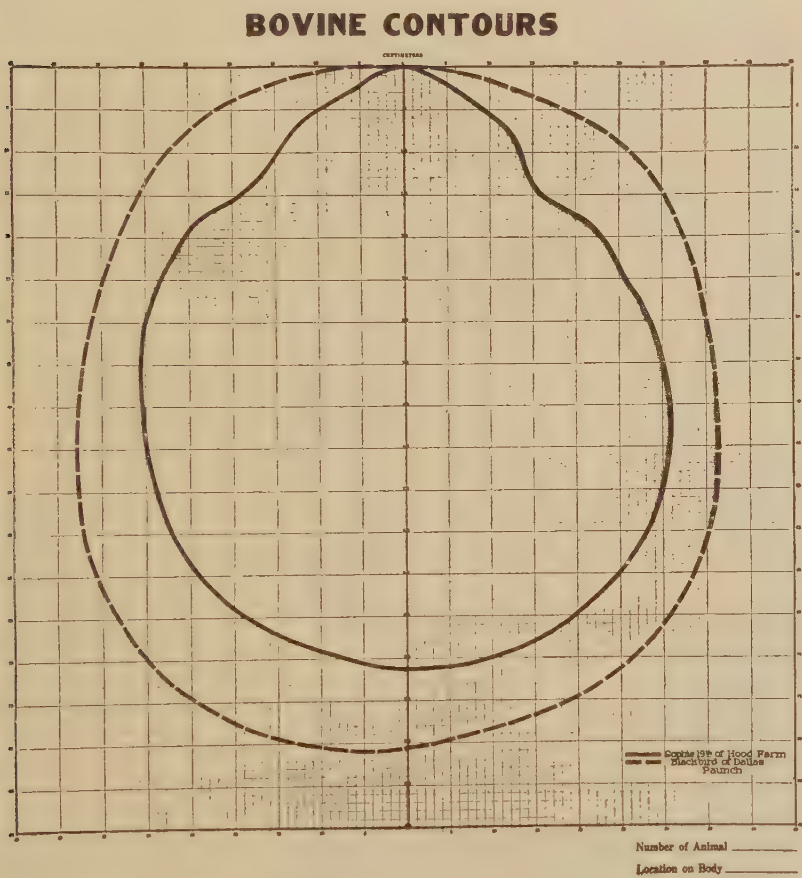

FIGURE 49.—Contours of paunches of Sophie and Blackbird

each was about one-half pound less than the average heart weight obtained in the study of more than 200 cows in a packing house. The weight of thyroid was much greater for Blackbird than for Sophie. This can be attributed largely to interlaying of fat in the thyroid of Blackbird. In general, the differences in size of organs are not sufficiently great to indicate significant differences in function.

After the skeletons were cleaned and assembled they were measured in detail. Contours similar to those made on the living animals were prepared. In the fore chest the skeleton of Sophie is narrower and deeper than that of Blackbird. The contour or cross-section areas,

however, are almost exactly the same. What Sophie's skeleton lacks in width is made up in depth. The contours of the upper part of the paunch also show less width but greater depth for Sophie. The areas, however, were similar for the two cows. Again, the lack of arch of ribs in Sophie's skeleton is much more than made up in depth of body.

Skeletons Markedly Similar

Caliper measurements of the skeletons show that Blackbird is slightly wider in the fore chest, narrower in the rear chest, and of the same maximum width of paunch. Blackbird is consistently more shallow in skeletal structure and has less vertical wedge shape than Sophie. The two skeletons exhibit almost exactly the same degree of wedge shape laterally. These conditions are greatly in contrast to their external conformation, which showed a distinctly greater vertical wedge for Blackbird and a much greater lateral wedge for Sophie.

FIGURE 50.—Vertical transverse section through the rear quarters of Sophie's udder

Judges of dairy cattle are inclined to attach considerable importance to the openness of conformation or the width of spaces between ribs, spinous processes, and vertebræ, believing that such openness allows more space for nerves to pass out through the spine from the spinal cord. The canals through which the nerves and blood vessels pass are called foramina. Some of these canals are formed by notches in the ends of adjoining vertebræ. Others are present in the form of a distinct hole through the vertebra itself. In these two skeletons the holes through the vertebræ are more numerous than the notches between them. Nerves passing through the holes in the vertebræ could hardly be restricted or otherwise influenced by closeness or openness of conformation. Furthermore, those that appear as notches between the vertebræ are nearly all in the region of the loin, where the distances between spinous processes are not readily determined by examining the living animal. Judgment of the width of spaces between spinous

processes in the living animal, therefore, could hardly be significant of the freedom of passage of nerves from the spinal cord. It appears that the nerves which control the udder pass out between the second and third vertebræ of the loin. At this location the foramina measure 2.55 centimeters for Sophie and 1.68 centimeters for Blackbird. The significance of these diameters may be subject to speculation.

In skeletal structure the two cows are generally similar. This indicates that in the evolution of the dairy and beef types, which has been

FIGURE 51.—Vertical transverse section through the rear quarter of Blackbird's udder

accomplished through breeding and selection, their skeletal structure has not been materially changed, but rather that the difference in type is due to extreme fleshing of the beef cow and to udder development and absence of fleshing of the dairy cow.

The general appearance of the udders of these two cows was perhaps not more different than that of udders selected at random from cows of two different breeds. The big surprise came when the udders were cut into cross-section slices. (Figs. 50 and 51.) The udder of Sophie

had gland tissue over practically its entire area in both front and rear quarters. Blackbird's udder, on the contrary, had in the rear quarter an area of gland tissue somewhat irregular in shape, about 5½ inches at its maximum width and surrounded on the top and sides with solid fat. In the front quarter the gland tissue was almost lacking. Obviously, the udder of Blackbird was extremely limited in capacity for milk production. Aside from their external conformation, the most marked difference found between the two cows was in the quantity of secretory tissue in the udders.

W. W. SWETT,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Bulls Should be Kept Alive Until Their Value Is Known Previous to January 1, 1929, the Bureau of Dairy Industry proved 635 dairy bulls, mated with cows in dairy-herd-improvement associations, by comparing the yearly production records of five or more unselected daughters of each bull with the yearly production records of their dams. Reports received from the field show that at the time these bulls were proved 100 were alive and 433 were dead. No definite information was obtainable regarding the remainder. Only 100 living bulls out of a total of 635 is not a good record unless it can be shown that only the inferior bulls were disposed of.

In order to determine the relative merits of the 100 living bulls and the 433 dead bulls, the dam and daughter records of the former were compared with those of the latter. Table 6 gives the information obtained.

TABLE 6.—*Comparison of dam and daughter records of 100 living and 433 dead dairy bulls*

Item		Sires living	Sires dead
Sires in group	number	100	433
Average butterfat production of daughters	pounds	408	394
Average butterfat production of dams of daughters	do	373	368
Average gain of daughters over dams	do	35	26
	per cent	9.4	7.1

Table 6 shows that the living bulls increased the production of their daughters over that of the dams of the daughters only slightly more in per cent than did the dead bulls. Of the 100 living proved bulls, 21 actually lowered butterfat production and only about 50 increased it appreciably over that of high-producing dams.

Owners Fail to Discriminate Closely

This study indicates that the owners of dairy bulls do not discriminate closely when sending bulls to the butcher. Many of them keep the inferior bulls until they are proved and send the meritorious bulls to the block. It may seem strange that experienced dairymen will do this. They have no way of knowing the true value of a dairy bull, however, until the records of the daughters prove his value. The only way to make sure of keeping all the meritorious bulls until they are

proved, therefore, is to keep all the bulls until they are proved. The wisest plan for the dairyman to follow is to select young, well-formed bulls on the basis of their pedigree, use them in a limited way until their daughters prove their value, let the butcher have those that do not come up to a set standard, and keep in service only those that have demonstrated their ability to improve their owner's herd.

The following tabulation gives the record of a highly meritorious proved bull that was sent to the butcher before the records of his daughters were available:

Daughters	number	12
Average yearly butterfat production of daughters	pounds	439
Average yearly butterfat production of dams	do	331
Gains of daughters over dams	do	108
	per cent	32. 8

This bull was disposed of to prevent inbreeding. He should have been kept in some herd as long as he lived or was fit for service. Had this been done, he might have become the sire of more than 100 high-producing daughters.

The following tabulation gives the record of a bull that was kept alive until proved, though he lowered production in the herd in which he was used. He might have brought improvement in a lower producing herd.

FIGURE 52.—A purebred dairy bull whose daughters greatly exceeded their dams in butterfat production

Daughters	number	14
Average yearly butterfat production of daughters	pounds	328
Average yearly butterfat production of dams	do	390
Decrease in daughters' production	do	62
	per cent	15. 7

The following tabulation gives the records of a highly meritorious bull (fig. 52) that was kept alive until the records of his daughters and their dams proved his value:

Daughters	number	21
Average yearly butterfat production of daughters	pounds	524
Average yearly butterfat production of dams	do	423
Gain of daughters over dams	do	101
	per cent	24

Production Possibilities That Could Be Realized

If a herd could have at its head a bull like this for a few generations, it would be a leader in average production of butterfat per cow. If a dairy herd improvement association could use sires like this in all its herds for a few generations, that association would lead all others in this country. If a State could use sires like this in all its dairy herds,

it would soon lead the world in average production of butterfat per cow.

Since the value of a bull can not be determined until his daughters' production records are available, every bull worthy to be in the herd at all should be kept alive until proved; otherwise, the proved-sire work is doomed to failure. In order to handle bulls with safety while they are being proved, the well-built modern bull pen, yard, and breeding stall are essential. In some cases an old building may be remodeled and a strong fence built at little expense. Even at present prices for labor and materials the equipment shown in Figure 53 can be built for less than $300.

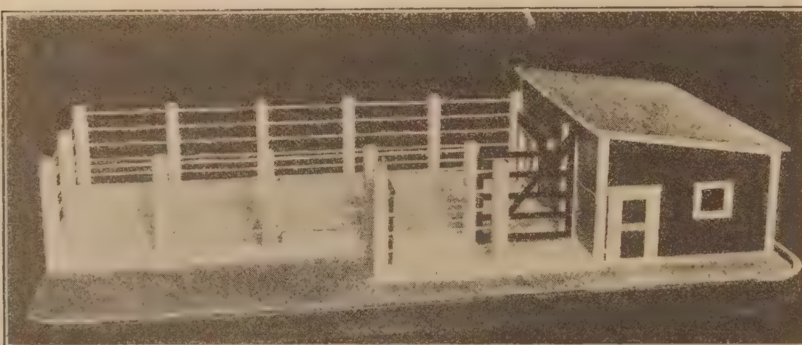

FIGURE 53.—A well-built pen, yard, and breeding stall are essential for the safe handling of the dairy bull

At the present time, through the records of dairy herd improvement associations, 200 to 300 bulls are being proved annually, but most of these are dead. The time is coming when thousands of living purebred meritorious dairy bulls will be proved in a single year. These sires will bring about a great improvement in the dairy herds of this country.

J. C. McDOWELL,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Cattle Breeding in Pure Lines Offers Great Possibilities The genetic make-up of organisms as found in their natural condition of development is largely determined by the reproductive method which is indigenous to the particular species. Propagation in plants and animals is brought about in a variety of ways. Those species which increase in numbers by division of the parent or by offshoots from the parent have very limited facilities for changing their genetic make-up, and variations in these species depend upon mutations or chromosome aberrations; otherwise the offspring are the same as the parent.

In species where succeeding generations are the result of fertilization of the ova of the parent, there are limited or unlimited possibilities for variation depending upon whether the organism is self-fertilized or cross-fertilized. Self-fertilization, as in the case of wheat, is an intense form of inbreeding and results in a homozygous genetic state, or a pure line. There are a number of self-fertilized species of plants, and this reproductive habit has been a boon to the plant breeder as he has in any single seed of such a species the foundation of a pure line.

Those varieties of plants and animals which are normally bisexual reproduce by cross-fertilization. This method results in a population of mixed or heterozygous genetic make-up, as in random matings it is rarely possible that both parents are genetically the same.

The hope of the plant or animal breeder for bringing about improvement in his stock lies in the variations which exist in the population. To proceed intelligently, however, he must first analyze his material. This is best accomplished by close inbreeding, whereby he uncovers the recessive factors which have been masked by their dominant allelomorphs, and also reduces his breeding stock to a homozygous condition.

Gratifying Results With Corn

Corn breeders have pursued this method with gratifying results. Corn is normally cross-fertilized, and the existing populations are extremely heterozygous. By careful self-fertilization for seven generations a condition of 99 per cent homozygosity was reached, which approximates the pure lines existing in naturally self-fertilized species. It is true that production of these pure lines was accompanied by a general loss of vigor as evidenced by greatly reduced size, slow rate of growth, and diminished yield, but all of these factors were fully restored when these pure lines were intermated.

As most species of animals are bisexual, the plant breeders' method of self-fertilization is not available for the animal breeders, and other methods of inbreeding must be resorted to in order to produce pure lines. With insects and small laboratory animals close inbreeding, such as the mating of full brothers and sisters and litter mates, has been extensively practiced for numerous generations. The results have often paralleled those of the plant breeders, and losses of vigor and declines in fecundity have attended this practice, but the increased homozygosity is evident in the offspring, although the rate of approach to the pure line is slower than in artifically self-fertilized plants.

The decline in vigor which accompanies inbreeding is perhaps unjustly attributed to the consanguinous breeding, for it is not the method which causes the diminished vigor, since the causes for the decline were present in the parent stock and inbreeding merely unmasked those undesirable factors. Inbreeding from a parent stock void of these weaknesses would not be attended by detrimental results.

As a means of improving the milk-producing ability of dairy cattle, pure-line breeding offers possibilities which may not be fully appreciated by modern breeders. First of all, where pure-line breeding referred to above included the entire genetic make-up, it is not necessary to make its application to dairy cattle so all-inclusive. The number of factors which control milk production is purely speculative, but that need not be an insurmountable barrier to the application of other known facts to breeding for improved milk production.

In the light of present knowledge two methods are open to the breed improver. Evidence points to the fact that the dairy-cattle population is largely heterozygous, which is true of most species where random mating is largely practiced. It is possible, however to select from this random-bred stock those males which show evidence of transmitting largely the factors for high milk production. This is determined, of course, entirely from the progeny test. If a sire has daughters

which are all capable of greater production than their random-bred dams, it is evident that he is transmitting high production to his progeny.

Best Method Through Inbreeding

The best method of concentrating these high milk-production factors is through inbreeding. Therefore, one way to proceed is to breed the daughters back to their own sire and continue inbreeding as long as the bull remains serviceable. This method carries all the dangers of close inbreeding as there will be concentration of undesirable as well as desirable factors. The principles involved, however, are the same as those in corn breeding, and even if some decline in vigor accompanies this practice, the establishment of two or more lines pure for high milk production would afford material for crossing these pure lines with a restoration of vigor. There would be no possibility for a decline in producing ability, since that is pure in all lines.

If the fear of disaster overshadows the benefits which would follow the development of pure lines by inbreeding, another method can be followed, although the desired result may come more slowly. This method is the continued use for generation after generation of sires which transmit factors for high production. By this method each sire increases the proportion of factors for high production in the herd, and homozygosity is gradually approached. By judicious selection there need be no close relationship between succeeding sires and unless undesirable factors are closely associated with those governing high milk flow, there could be no loss of vigor. The daughters of the first proved sire are bred to a second proved sire, and his daughters in turn are mated to a third proved sire, and so on until the line is pure for high milk production. Instead of inbreeding this method would be classed as outbreeding.

All Animals Profitable in Pure Line

Pure lines of plants breed true, and so a strain of dairy cattle bred pure for high production would all be profitable producers and when intermated their progeny would likewise produce profitably. One great economic loss to the dairy industry is brought about by the necessity of culling from herds the cows which fail to reach a profitable level of production. It is patent that ordinary breeding methods have failed to eliminate this loss. The pure-line method of breeding will result in a race of dairy cows all capable of profitable production and will further benefit the breeders by greatly raising the average production level of all cows.

M. H. Fohrman,
Senior Dairy Husbandman, Bureau of Dairy Industry.

Dairy Cows When Dry Can Be Wintered on Legume Silage Alone

Because of repeated failures at the Ardmore, S. Dak., field station in making either a satisfactory pasture or hay from sweetclover, it was decided to place this crop in a silo. Although sweetclover as a pasture crop grew fairly well under the dry-land conditions at this station, it has been difficult, and even impossible with some cows, to force them to graze the pasture. The reason for this is its extremely bitter taste,

which is probably due to the high coumarin content. This extreme condition has not been encountered at the other stations of the bureau. Sweetclover hay has also been made; and although the bitter taste was not so apparent, the hay shattered badly and was not palatable.

In 1928, about 25 tons of white sweetclover were placed in a silo. When cut on June 28, it was about 3½ feet high and just coming into bloom. The moisture content was approximately 60 per cent, and no water was added. Corn silage from the previous year was blown into the silo at the rate of 1 ton of corn silage to 20 tons of sweetclover. This was thought desirable in order to furnish additional carbohydrates for better fermentation. The resulting silage was dark green in color, heavier than corn silage, and had a pungent odor which lessened as the silage aged. It kept excellently, there being practically no spoilage. Apparently the bitter coumarin taste had disappeared.

Four cows, two milking and two dry, were fed this silage. Two of the cows received silage alone; and the other two received, in addition, 3 pounds of oats straw daily for a period of 126 days. The cows did not seem to relish the silage, although when forced to eat it one consumed up to 94 pounds per day. Two of the cows consumed an average of 60 pounds per day for 126 days. One cow refused it entirely after 30 days. The addition of a small quantity of straw to the ration did not materially affect the amount of silage consumed. The cows lost an average of 182 pounds in weight. The production of both milking cows dropped greatly.

Sweetclover Silage as Winter Ration

Sweetclover silage may prove valuable as a wintering ration for dry cows and heifers under dry-land conditions during years when other feed crops fail. Sweetclover can be placed in an inexpensive silo, such as a trench, and be the principal feed for the dry stock through the winter.

At the Huntley, Mont., field station, two milking cows were fed a ration of alfalfa silage and corn silage exclusively for a period of 138 days. In making the alfalfa silage, 1 part of beet molasses was added to each 20 parts of first-cutting alfalfa. The two cows showed a preference for the corn silage at all times. One cow consumed an average of 62 pounds of silage per day for the 138-day period and the other averaged 56 pounds daily. The cows seemed to crave dry feed. They were always more or less gaunt in appearance and lost an average of 190 pounds in weight.

One cow was producing 49 pounds of milk per day when the experiment started. On the fifteenth day her production had dropped to 38 pounds a day. The decrease continued until the forty-seventh day, when she was producing 31 pounds. She continued at this level until the end of the trial. The other cow calved on the seventeenth day after the silage-feeding trial started and produced 34 pounds of milk a day. Her production dropped to 30 pounds and remained at that level until the end of the trial. The decrease in butterfat production between the first and fourth full months on the silage ration was 18.8 per cent for the first cow, and 25 per cent for the second cow.

Results show that alfalfa with a small amount of beet molasses makes a satisfactory silage. This fact should be of considerable importance in localities where the first cutting of hay is coarse, weedy, and unpalatable. Furthermore in many regions legume hays can be

successfully grown, but curing is difficult because of rains or high humidity.

Since cows consume large quantities of legume silage, apparently with no harmful physical effects, when no other feed is given them, it may under certain conditions be feasible to winter dry cows and heifers on legume silage.

An interesting feature of the legume-silage feeding was the inability of the animals to maintain an appetite for large quantities of silage. Many of the cows consumed large quantities for a few days, but invariably the consumption declined after a short time to relatively small quantities.

J. R. Dawson,
Senior Dairy Husbandman, Bureau of Dairy Industry.

DAIRY Organizations Get Results Through Quality-Control Work It is estimated that approximately $40,000,000 are lost each year through producing milk and cream of poor quality. In order to reduce these losses a number of commercial dairy organizations have added quality-control divisions to assist the farmer members in producing milk of better quality.

Studies were made by the Bureau of Dairy Industry of seven of these organizations, which annually assisted more than 55,000 farmers producing over 1,000,000 gallons of milk per day, or nearly 400,000,000 gallons per year. The methods employed by these organizations varied considerably. One organization made routine inspection of all its farms about twice a year. Another inspected about 50 per cent of its farms, visiting monthly those handling grade A milk and about once every three months those handling grade B milk. Field men from one of the large milk companies receiving the milk inspected the other 50 per cent of the farms. One organization made routine inspections of a small number of its farms which were not city inspected. Generally it inspected only those farms producing dirty milk or milk of high bacterial count. Another inspected all farms twice, after which only those having trouble were visited. Still another inspected all farms once, after which only the low-scoring farms and those having trouble were reinspected. The remaining two organizations visited only those farms having trouble.

Routine Laboratory Tests Made

Five of the associations made routine laboratory tests of each shipper's milk. Only one of these employed a special laboratory force for making analyses. In the other four the laboratory tests were made by the inspectors, who had had training along this line. One of the two organizations making no laboratory tests at the time of study was planning to make microscopic counts of bacteria in the near future. All the organizations making laboratory analyses also made sediment tests of the milk.

One association used the methylene-blue test to determine quality; the others used the Breed microscopic count for estimating the number of bacteria in the milk. Plate counts were also made by one or-

ganization on all grade A milk; and they were also made occasionally by another organization, chiefly on plant samples.

The number of men employed in this work varied from 2 to 69, depending on the size of the organization and the intensiveness of the work done. Generally, the men spent their entire time on this work, but in several of the associations they did other things, such as obtaining new members and subscriptions and testing the milk for butter fat. Of the 69 field men in the one organization, 6 were veterinarians. This organization also employed 16 laboratory workers in addition to the field men. A total of 102 men, not including the laboratory workers, were employed by the seven associations.

The cost of the work per organization varied from approximately $6,000 to $280,000 per year. The total cost for all was a little over $400,000 per year. The cost per farm was about $7.25 per year, and per gallon of milk about 0.1 cent.

Grading, together with a premium for extra quality or a deduction for poor quality, was employed by most of the associations as an incentive to the farmer to produce better milk.

In one organization the grading was based on the farm and cattle score, which included the sanitary conditions prevailing on the farm, the equipment and methods employed in handling the milk, and the health of the cattle. In the others the grading was based directly on the quality of the milk as shown by the temperature, the number of bacteria, and the sediment.

In four of the organizations all the farmers had an equal chance of obtaining a premium for producing quality milk. In the other three, the number of farmers were limited by the demand for grade A milk and by the necessity of being located in a territory handling grade A milk.

Premiums Paid for Quality Milk

In four cases the premium for quality milk was paid by the milk plants receiving the milk. In one of these the premium varied from 1 to 5 cents per gallon, and in the other three it varied from 15 to 40 cents per hundred pounds. In another instance a premium of 5 cents per hundred pounds of milk was paid by the producers' association. Two organizations deducted 15 to 25 cents per hundred pounds for poor-quality milk.

The general report from the organizations is that paying for milk on the quality basis, either by giving a premium for good quality or by making a deduction for poor quality, has been a great help in getting the members to produce better milk. This is especially true where all the farmers have an equal opportunity to receive a premium for their milk if it is of good quality. Under such conditions they are generally willing to follow suggestions for improving the milk supply, and the inspector or field man becomes a welcome visitor instead of an unwelcome one.

One association had been doing quality-improvement work for about two and a half years. At the end of that time it was decided to pay a small premium for a good-quality milk. The first month only about 25 per cent of its members received the premium; at the end of a year about 75 per cent received it.

No complete record was available from any of the organizations as to what they had accomplished since starting their quality-control

work. That they had accomplished something, however, is shown by the following statements:

One organization reported that in a little over a year the average premium received by its producers for their milk increased from less than 1 cent per gallon to a little over 2 cents per gallon.

Another reported that on the first check-up about 9 per cent of the farms were rated poor; after a little over a year's work only about 5 per cent were in that class.

Still another reported that in 1927 it started rating plants on the basis of the quality of the milk received. That year only 9 of 67 plants had 90 per cent or more of the tests made at their plants grading as excellent or good. In 1928, 23 out of 78 plants were in this class.

L. H. BURGWALD,
Associate Market Milk Specialist, Bureau of Dairy Industry.

DAIRY Production Shifting as Urban Milk Demand Grows

Fluid-milk areas that supply large urban centers of population have been expanding for many years, and certain Eastern States that formerly led in the production of manufactured dairy products are dropping down the list as important manufacturers of such products. They still rank high as dairy States, but their heavy and, in many cases, increased milk production has been more fully utilized in supplying the demand for milk and cream in the large cities.

Such changes have been accepted as normal developments in the Eastern and New England States, but when any of the mid-Western States begin to show marked changes as a result of this same kind of influence, the condition becomes of exceptional interest.

Perhaps the greatest change in the mid-west area is found in Wisconsin, where for many years the great bulk of domestic cheese has been manufactured. Wisconsin reached its highest rank as a producer of cheese about 1926, when 71 per cent of all the cheese manufactured in the United States came from plants in that State. Shortly afterwards, conditions developed that had a marked influence on Wisconsin's cheese production. Although still outranking other States by far, Wisconsin's share of the United States total dropped to approximately 62 per cent in 1928. United States production in 1928 increased substantially over 1927, and was the heaviest on record. This is evidence that other States have gone into cheese production on a larger scale.

For the most part changes in these other States represent new enterprises, particularly in the South, and in States bordering on the South, where the most notable increases have occurred. The official report for 1928 shows cheese production in Arkansas, Georgia, Kentucky, Mississippi, and Texas, where previously it was of no importance. Production in Mississippi in 1928 was 2,333,000 pounds compared with 15,000 pounds the previous year. Production in Texas was nearly 1,000,000 pounds, compared with none the year before.

Indiana increased its cheese production from less than 750,000 pounds to nearly 5,000,000 pounds, and Missouri from 500,000 to nearly 2,500,000 pounds. Kansas's production was 10 times greater in 1928 than in 1927. Idaho and Montana showed substantial gains.

In practically all these States interest in cheese production has been greatly stimulated during recent years. Future developments will

determine how much they may be depended on to take up the slack if Wisconsin shifts still more to other dairy products. The problem in the Southern States seems to be to obtain adequate milk supplies, and to make a quality of cheese equal to Wisconsin cheese.

Two Factors in Wisconsin's Problem

Two important influences may be mentioned among the factors responsible for Wisconsin's relatively changed position in cheese production. First is an increasing demand for fluid milk for Chicago and Wisconsin cities. Certain new requirements by the Chicago Health Department during the past two or three years were responsible for some shift in the territory that supplies Chicago with milk. Increased quantities of Wisconsin milk are now going into Chicago. Chicago milk distributors sought new sources of supply in Wisconsin's cheese and condensery territory because of its proximity and because dairymen there were used to selling fluid milk. The principal adjustment was that of meeting the sanitary and health requirements of the Chicago Health Department, which included the tuberculin test. Adequate road conditions aided the change, for motor-truck transportation is an important factor in Chicago's daily milk supply.

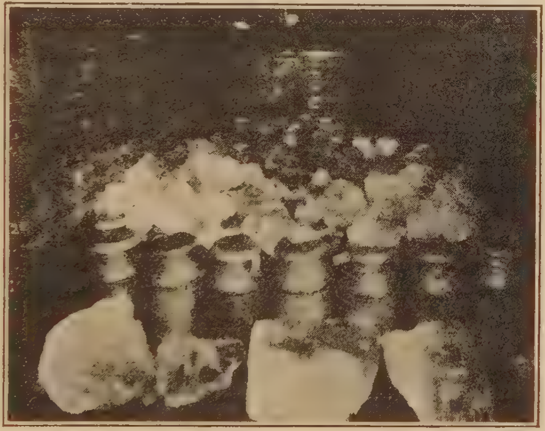

FIGURE 54.—Successful long-distance shipping has opened new outlets for sweet cream produced in the mid-west

The second influence was the opening of outlets for sweet cream, through the improvement of handling methods and rail transportation facilities. During the first eight months of 1929, approximately 85,000 cans (10 gallons each) of sweet cream from Wisconsin were received at New York and Philadelphia alone. This was the equivalent of 425 carloads, and represented approximately 2,750,000 pounds of butterfat. Had the milk represented by this butterfat been made into cheese, it would have amounted to more than 7,000,000 pounds. Receipts at New York during the first eight months in 1929 were almost three times heavier than during the same period in 1928.

These developments in Wisconsin, along with substantial gains in the production of condensed and evaporated milk, have had a noticeable effect upon butter production. In 1920 about 11 per cent of our domestic butter supply was produced in Wisconsin. In 1928 the percentage was only 9.2 per cent. Butter production in the adjoining State of Iowa, however, increased from approximately 10 per cent of the total United States supply in 1920 to 13 per cent in 1928. Minnesota's production increased from 14 per cent to 18 per cent.

Significant shifts in dairy production are occurring in the Pacific Coast States, where butter production has been declining during recent

years because of an increased demand for whole milk and sweet cream to supply city trade, ice-cream manufacturers, and condenseries, at better prices than were obtained through outlets for butter making.

L. M. Davis,
Senior Marketing Specialist, Bureau of Agricultural Economics.

DIET in Town and Country Compared in General Survey From city people you often hear the statement, "If you really want good food you have to go back to the farm to get it." Then follows a list of the delicacies which are supposed to appear every day on the farmer's table—fried chicken, thick rich cream, luscious fruits fresh from tree or vine, and vegetables straight from the garden. In sharp contrast come warnings from teachers of nutrition who say that farm families are likely to neglect some of the foods most important from a dietary viewpoint, and that all too often the farm diet consists largely of bread, potatoes, and fresh or cured pork. It has even been asserted that it is easier for a family to be properly nourished in the city than in the country since fresh fruits and vegetables are to be found in great variety all the year round in city markets.

Such conflicting statements leave one wondering what is the truth about the diets of the farm and city families. Some figures which throw light on the question are now available from careful studies that have been made of the food consumed by American families. From them we find that, on the average, the food consumed on the farm yields more energy, calcium, and phosphorus, and about the same amount of protein and iron as that consumed in the city. Energy is used up in the business of living, working, and playing, and must therefore be supplied by our food in amounts adequate to replace that which is burned up to keep these processes going. Calcium, phosphorus, and iron are minerals necessary to keep the human machine operating smoothly. Furthermore, these minerals, together with protein, are essential for normal growth and repair of broken-down tissues.

In addition to these food constituents, there is another group of nutrients which must be taken into consideration in the comparison of diets, namely, the six vitamins. It is not possible to state with any accuracy the amount of vitamins available in the foods, but it is possible to estimate them by determining the importance in the diet of the foodstuffs rich in these factors. The foods that are especially good sources of vitamins are the dairy products, fruits, and vegetables. They are also valuable sources of calcium and phosphorus. Iron is derived largely from meat, eggs, vegetables, and whole-grain cereals, and protein from meat, eggs, milk, and cereals. All foods yield energy, but the best source is fats, sweets, and cereals.

Milk Consumption Greater on Farm

In terms of energy yielded by the food consumed, the two groups of families, urban and rural, use comparable amounts of meat, eggs, fish, fats, and sweets. But milk consumption is almost twice as great on the farm, and cereal consumption is 25 per cent higher in the city. More potatoes are consumed on the farm than in the city, but total vegetables and fruits are more important in the urban diet. Alto-

gether 12 foods—beef, pork, other meat, fish, milk, eggs, cheese, butter, lard, wheat flour, sugar, and potatoes—furnish about 75 per cent of the energy of the urban diet and 85 per cent of the farm diet.

Because of the importance of dairy products in the American farm diet, the nutritive need of the group is, on the whole, more adequately met, but the evidence is strong that the urban diet is more varied, deriving, as it does, 25 per cent of its energy from foods other than meat, fish, eggs, dairy products, lard, wheat flour, sugar, and potatoes. The farm diet derives only 15 per cent of its energy from other sources. These include largely fruit, green vegetables, and cereals other than wheat.

The figures that are given here represent averages for the country as a whole. In certain parts of the United States the conditions which prevail are very different. This is especially true in the cotton regions of the South, where 70 per cent of the population is rural. The disease known as pellagra is much more frequent here than in the urban population. It is a deficiency disease caused by a diet lacking in one of the vitamins. The diet of the people affected consists, on the whole, of cornmeal, fatback, and sirup or molasses—foods valuable largely for energy. After a poor cotton year, or a disaster like a Mississippi flood, the disease is especially severe among the farm families. In order to correct the trouble, the limited diet commonly used by such families must be supplemented by dairy products, fruits, and vegetables.

From the evidence that is available, it is difficult to say definitely whether the rural or urban diet is superior. In either case, when it is limited to a few foods, the danger of deficiency diseases is greatly increased, but if milk, fruits, and vegetables make up an important proportion of the foods consumed, a very monotonous diet may become almost adequate. The only nutrient likely to be deficient in such a diet is iron, a factor found largely in whole-grain cereals, meat, eggs, and vegetables.

Edith Hawley,
Senior Home Economist, Bureau of Home Economics.

DIET Selection Aided by Broadcasting of Menus and Recipes

The book of radio menus and recipes first issued by the Radio Service in cooperation with the Bureau of Home Economics in 1926 in loose-leaf mimeographed form has gone into a third enlarged and revised printed edition. This might pass as a fact of no particular importance were it not an index of listener interest in the department's radio programs for women. It is of even greater significance as a measure of the form in which the public wants and calls steadily for more information on food values, nutrition, and applied food economics.

A recipe or a menu on first thought seems trivial—a particular dish or combination, eaten to-day and forgotten to-morrow. Taken by and large, however, they make up the food habits of individuals, nations, races, and each year brings more definite scientific proof of the connection between dietary customs and health. Pellagra, rickets, scurvy, dental caries, and other less obvious but no less serious disorders are traceable to lack of specific food constituents over varying periods of time. Small wonder then that the demand increases for methods of preparing and serving foods that incorporate the nutritive elements emphasized as important by the latest findings of science.

For about 40 years the Department of Agriculture has been active in gathering information on food values and habits. It has helped to define the rudiments of scientific food selection and to get calorie, protein, vitamin, and other nutrition terms into the lay vocabulary. Almost everybody now knows in a general way that the day's meal should contain the right food elements in the right proportions, but in the hurry and scurry of buying foodstuffs and preparing meals these principles do not always get into practice.

Listener Response Shown in Heavy Mail

In fact not until the radio programs for housekeepers were started in 1926 was it realized how great is the need for the translation of nutrition facts into the simple, practical terms of menus and recipes. Within the first month letters began trickling into the Radio Service and the Bureau of Home Economics saying that Aunt Sammy had solved that perplexing, daily recurring household problem—what to have for dinner. These letters have grown steadily in volume until at the height of the winter 15,000 a month are received. Along with many of the requests for the book of radio recipes and menus, come questions indicating the effect of food faddism, unethical advertising, and half knowledge of scientific facts that oftentimes works more harm than good. The opinion of the department is sought as an impartial authority likely to have first-hand information based on extensive research.

As a medium for giving economic information on foodstuffs to the home maker in a form she can put to immediate use, the menus and recipes are proving equally effective. New foods gaining in agricultural importance are introduced to her, not in general terms, but with explicit directions for cooking and serving so that she need have no hesitancy about giving them a trial. For the old familiar foods, new and improved methods of preparation are described. Seasonal fluctuations in supplies are constantly taken into account, and in times of overproduction of certain foodstuffs ways are suggested for their more abundant use without unduly restricting the consumption of other staples.

The menus and recipes can be related only to widespread market conditions, however, for the programs go to over 100 radio stations for broadcasting in every part of the United States. With this nationwide scheme of distribution it is no easy job, especially in midwinter, to plan dinners equally acceptable in Montana and Mississippi, Maine and Arizona, and to take advantage of the profusion of fresh foods available in metropolitan markets without emphasizing the limitations of the small-town grocery. It is expected that the menus will, more often than not, be changed to suit local supplies. A range of choice is often given to show how easy it is to substitute spinach for cabbage, kale, or whatever the green-leaf vegetable may be, and to use rice, macaroni, hominy, potatoes, and the various starchy foods interchangeably and still maintain the same nutritive balance.

Growing Demand for Nutrition Facts

As a by-product of its research in food utilization, vitamin studies, food habits, and child feeding, the Bureau of Home Economics has supplied 400 menus and 450 recipes to the Housekeepers' Chats since their start on a five-a-week basis in the fall of 1926. Though the

broadcasting of scientific material by radio is still in its early stages, more than 500,000 home makers have already registered their approval of this disinterested service. This does not mean that these women have become "recipe-minded." The stock jokes about women's club meetings being recipe exchanges are as out of date as the old quips on the hayseed farmer. The American people are food-conscious in a new way. There is a growing desire on the part of the average consumer for knowledge on how best to make food supplies function toward better nutrition and an increasing interest in applying economic principles to everyday food selection. The radio menus and recipes are an answer to both, and a link between the research of the department on food production, distribution, and utilization.

RUTH VAN DEMAN,
Associate Specialist in Charge of Information,
Bureau of Home Economics.

DRAINING of Irrigated Land by Pumping From Wells Often Advisable The draining of irrigated lands presents more difficult physical and economic problems than does irrigation itself. Often the need for drainage is not anticipated and when water-logging and its attendant evils require large expenditures which bring no direct benefits, except to protect the original investment for irrigation, the financial burden becomes very great. After a number of years those in charge of some irrigation enterprises find that an additional irrigation supply is necessary for complete development, while at the same time they are confronted with the problem of removing excess water from low areas, and usually deep gravity drains discharge the water at a point too low for reuse.

FIGURE 55. Type of pumping plants used for drainage in the Salt River Valley, Ariz.

It has been found that shallow drains are ineffective where alkali is present and for the past 25 years the trend has been toward deeper systems; drains 12 to 15 feet deep are not uncommon. Frequently water-logging develops in soils and subsoils so dense that even deep drains are effective only for very short distances, with the result that the cost of reclamation becomes very high.

Many gravity-drainage systems in the irrigated West, particularly those of the open type, are deteriorating because of lack of maintenance. Plant growths and silt accumulate rapidly and if they are not removed the drains cease to be effective and may eventually fill up.

Even underdrains are sometimes subject to trouble caused by displacement, silt, or roots. While a great number of successful gravity systems are in operation, it is gradually being realized that the cost of properly operating and maintaining these may be very high.

Great Advance in Drainage By Pumping

Perhaps the greatest advance that has been made in the drainage of irrigated lands is the adoption of pumping from wells. It has long been known that relief wells are effective under some conditions. Also the lowering of ground water by pumping is not new since the available supply has been depleted under areas pumped for irrigation. The Salt River Valley Water Users Association in Arizona successfully applied this system to the reclamation of water-logged areas and since then several other projects have adopted it and others are considering its use.

Any drainage system must have sufficient capacity to cause a general lowering of the water table. A gravity system should reach into a free water-bearing stratum; however, this is not always possible. The well method requires that such a formation be reached but it does not need to be near the ground surface as is the case with gravity drainage.

FIGURE 56.—Type of pumping plants used for drainage in San Joaquin Valley, Calif.

Wells can reach permeable layers at depths to which it is practically impossible to construct gravity drains. Drainage wells vary in depth from less than 100 to considerably over 200 feet, while the pumping lift varies from about 25 to over 50 feet.

A necessary physical condition for pumping is that there be a connection between the soil water near the surface, and the water-bearing stratum reached by the well. The well method has been used successfully where the subsoil appeared to be quite dense and relatively impermeable to considerable depths—so much so, in fact, that gravity drains were ineffective. However, some connection must have existed in these cases for it is obvious that pumping would not be effective if a continuous layer of wholly impermeable material separated the upper soil from the water-bearing layer penetrated by the well.

Drainage wells are spaced from one-quarter to 1 mile apart, and when the pumps are operating water moves laterally through the permeable layer toward the wells while water in the upper soil and subsoil moves more or less vertically downward to replenish the supply. The cross-sectional area through which this upper water moves is very large and the distance through which it must travel downward to produce desired results is very small, so that the required rate of movement is very slow. Thus water is extracted at a velocity but little or no greater than that existing when it was introduced into the soil.

Power Cost May Be High

While the first cost of a well-drainage system may be low, the annual cost for power, together with other expenses, may be quite high. A

majority of the projects using this method pay only approximately 1 cent per kilowatt hour for electrical power. At this rate it costs about $1 for power to pump 1 acre-foot through a lift of 50 feet. To this must be added items for interest on investment, depreciation, operation, and maintenance. A high cost of power might make pumping prohibitive under many conditions.

An advantage of the pumping method is that water is delivered at an elevation sufficient to permit its reuse. The majority of the projects employing this method are deriving some benefit, either by profitable use or sale, from most of the water developed. On practically all, the developed water has a real value to the project and this can be and is credited to the drainage account. In some instances the value of the water developed is nearly as great as the cost of pumping. Where such is the case, the cost of drainage is very low or almost nothing.

Well drainage provides a means for reclaiming some areas where, due to geological or topographical conditions, no other method is

FIGURE 57.—Two of the types of pumping plants used for drainage in San Joaquin Valley, Calif.

practicable. A system can be installed in small units. This permits great flexibility in design and operation. The method eliminates unsightly ditches and waste of land. It commends itself for consideration in the development of new irrigation projects where water is within easy pumping distance, thus reducing the gravity and storage supply that otherwise would be needed, while at the same time providing protection against the accumulation of alkali.

Pumping from wells is not recommended for all localities. Undoubtedly there are numerous places where it would fail and many others where gravity drainage would be cheaper. In general, however, it has met with such marked success thus far, that no new drainage project should be initiated nor the rehabilitation of an old inefficient gravity system undertaken without first giving some consideration to this method.

L. T. JESSUP,
Associate Drainage Engineer, Bureau of Public Roads.

ECONOMIC Periodicals Issued by Department Aid Farmer's Business

Misinformation causes the mercury of the agricultural price thermometer to fluctuate out of line with actual conditions. Market prices often change wildly on the circulation of false information. The Department of Agriculture, therefore, has built up the largest statistical organization in the world for gathering reliable crop and market information. It spends approximately $5,000,000 a year for the collection of statistics alone.

On all production, marketing, and prices the department compiles comprehensive information, and arranges it in a concise and understandable form. Some farmers are interested in following only one crop. To those who want to find out what is causing price variations, and who want to study conditions in more or less detail and to make interpretations of their own, the department gives a composite report of agricultural progress in a monthly periodical known as Crops and Markets.

Crops and Markets carries reports, showing crop acreage, crop conditions during the growing season, probable production, final production, yield per acre, and farm stocks; reports showing the condition, numbers, and values of livestock; reports on the farm-labor supply and demand, and wages paid to farm labor; reports on population changes; agricultural outlook and intentions-to-plant-and-breed reports; pig-survey returns; cost-of-production figures, and estimates of income from production. It also records shipments to or receipts at stated markets, and cold-storage holdings. It gives prices, both those received by producers and those paid at wholesale markets, as well as analyses of factors affecting the price situation. A set of charts in each issue shows at a glance the price trend of the major agricultural products.

No other periodical contains as many facts essential to agriculture. It is used not only by farmers but by State and Federal Government agencies, such as the Federal Farm Board, the Federal land banks and the intermediate credit banks, the extension services, the agricultural colleges and experiment stations, and the State marketing bureaus.

Crops and Markets is printed in an edition of 140,000 copies monthly, and goes to every State and Territorial possession of the United States as well as to a number of foreign countries. Under the provisions of a resolution of Congress, it is sent free to libraries, the press, Government officials, workers in agricultural colleges and experiment stations, and other institutions or individuals actually assisting the department in collecting or diffusing information. To others it is available at the nominal subscription of 60 cents a year (foreign rate 85 cents), payable to the Superintendent of Documents, Government Printing Office, Washington, D. C.

CATHERINE M. VIEHMANN,
Assistant Editor, Bureau of Agricultural Economics.

ECONOMIC Trend as It Affects the Farmer Summarized Monthly

How is the average farmer to keep posted on the thousand and one things which are happening every day in the year and all over the world, which directly affect his fortunes? Perhaps there is a strike in the British textile mills—its effects spread almost instantly over our Cotton Belt. Perhaps there is a drought in the Canadian wheat Provinces, or an extra shipload of Australian butter diverted to New York, or a sudden

freeze in our fruit sections. Perhaps the country takes an inventory of its hogs or cattle or other livestock, as is done periodically, or perhaps a new crop estimate reveals important changes on the supply end. An endless chain of events moves forward from day to day, all having a decided influence upon prices of farm products and ultimately upon farmers' incomes.

Washington has become a natural clearing house for information respecting these economic developments. The Department of Agriculture now has the machinery for learning very quickly of such developments, not only in this country but over the world at large.

The Bureau of Agricultural Economics, through its crop and livestock estimates, its agents in the markets, its foreign service, and other sources, receives a constant flow of such facts. At the same time a steady stream of reports goes out from this bureau carrying to farmers and the public a fairly complete picture of happenings, not only on the production end but on the marketing end as well. By telegraph, radio, press, and mail this flow of timely information is maintained.

Among other things, the Bureau of Agricultural Economics tries to bring together the most salient information each month and present it in very condensed form for busy farmers, extension men, agricultural tradesmen, and others. Thus, on the first day of every month it issues a publication of 24 pages called The Agricultural Situation. This little monthly, printed on distinctive blue paper, is sent free to various correspondents of the department and to public institutions and may be obtained by anyone at 25 cents per year.

This publication presents a tabloid picture of the events that largely influence the farmer's economic position from month to month. Throughout each month, the developments are watched respecting the growing crops and animals, the movement to market and into foreign trade, stocks in cold storage and elsewhere, the trend of prices and of consumption. The most significant items are picked out of this swiftly moving procession. These are pieced together to make up the picture of what is essentially the current agricultural situation. A few paragraphs, a few tables, a few charts, and the busy man can gain a very fair idea of the general trend of things.

This monthly publication differs from the many other types of reports issued by the department in that it presents this condensed bird's-eye view of significant changes, month by month. In these times of rapid, highly organized commerce, the successful farmer requires a fund of current information such as was not necessary a generation ago. He can not plan his operations without it but he is unable to follow all of the changes in detail or to read many reports. Here, for him is a condensed, boiled-down source.

A. B. Genung,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

EGG Prices Manifest Combined Influence of Storage and Consumption The receipts of eggs in the four principal markets (New York, Chicago, Philadelphia, and Boston) constitute our most representative index of production and consequently our best index of the influence of current supply on price. (Fig. 58.)

Receipts on these markets are the highest during the spring and early summer months and gradually decline in the fall until they reach the low point in November or December. In recent years there has been a gradual increase in production during the fall. This tendency is partly responsible for the downward trend in fall prices and the narrowing spread between the price at which eggs are placed in storage and the price at which they come out.

Cold-storage holdings of eggs perform an important market function and have a marked influence on prices of eggs, particularly in the fall and winter months. Uneven seasonal production results in a surplus during the spring and scarcity during the fall and winter, whereas the demand for eggs is relatively constant throughout the year. Therefore, it is one of the functions of the wholesale dealers and storage operators to obtain a supply in the spring adequate to meet consumer requirements as nearly as possible, at all seasons. This is brought

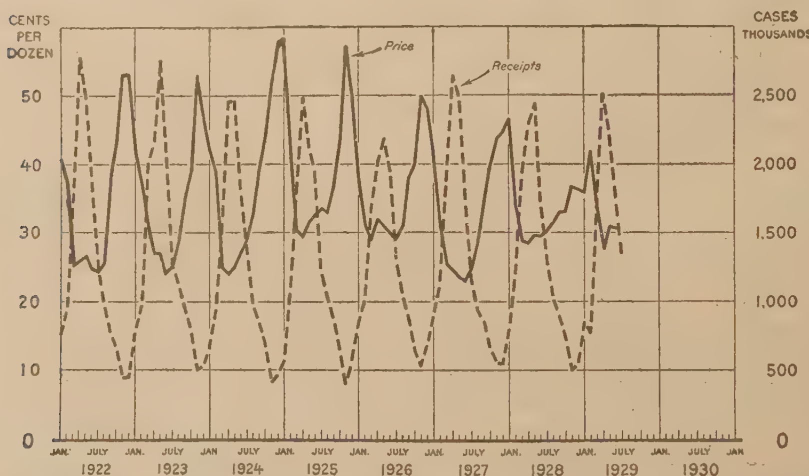

FIGURE 58.—Receipts of eggs at four markets and prices of fresh firsts in New York. The marked seasonal movement in the monthly receipts of eggs causes the variation in egg prices. The placing of eggs in storage during the spring months keeps prices from dropping in proportion to increase in receipts. Eggs from storage in the fall supplement the small current receipts and prevent prices from rising to prohibitive levels

about by moving a part of the eggs in the spring through the usual to channels for immediate consumption, while the greater part of the remainder is carefully handled, graded, packed, and shipped to cities be placed in cold storage until fall and winter. Eggs in the remaining portion of the supply are broken open, frozen, and placed in storage.

Twelve Per Cent of Production Stored

About 12 per cent of the total annual production of eggs is stored. Eggs move into storage during the months of March, April, May, June, and July and move out of storage during the other months. The peak of storage holdings is reached by August 1. Practically all of these eggs are taken from storage and consumed by the end of the following February.

As eggs are not carried over from one storage season to another, storage operations exert a large influence on prices. The cold storage of eggs is a sound, economic practice and performs a twofold function.

If eggs were not placed in storage in the spring, prices would be so low as to make egg production unprofitable to producers, whereas the fall supply would be inadequate and the price would rise beyond the reach of most consumers.

The practice of storing eggs in the flush season results in a demand from two sources—that for immediate consumption and that for storage. This tends to insure to the consumer an adequate supply of eggs throughout the year at reasonable prices, and to the producer a higher price during the season in which he has the largest quantity to sell.

The price that the consumer is willing to pay for eggs determines, to a large extent, what the egg dealers can pay. The relative importance of eggs in the menu of the average person is as yet undetermined, but it is considerable. Studies now under way should throw light on the consumers' demand and preference for eggs of different internal qualities and external appearance, as well as the consumers' response to varying prices for eggs of different qualities. When these and related

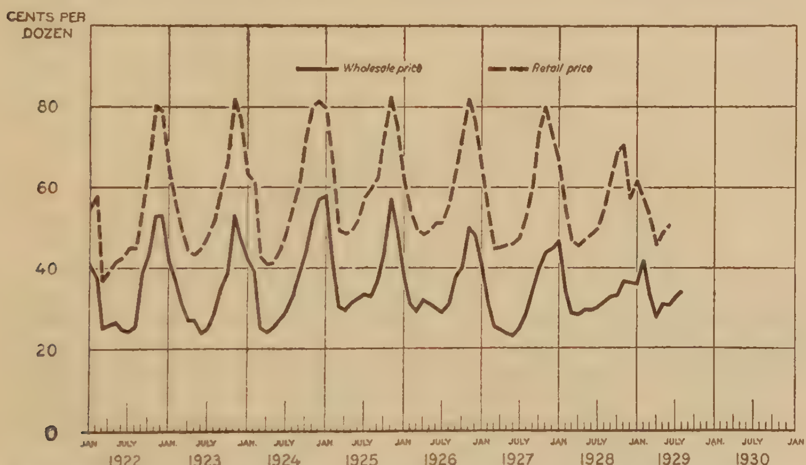

FIGURE 59.—Wholesale and retail prices of fresh eggs in New York City. Wholesale and retail prices tend to move together. Wholesale prices change as the supply varies and these changes are reflected in retail prices. Moreover, demand varies through the year which also has an influence on wholesale prices

facts become better known, and merchandising is conducted in accordance with the ascertained facts, it is probable that the demand factor will be found to exercise a more important influence in the determination of egg prices than it is now definitely known to exert.

Relation Between Retail and Wholesale Prices

Consumers' demand is reflected through the retailers, and retailers' demand is reflected through wholesalers. If the wholesalers buy large quantities at a given price, or the same quantity at a higher price, this indirectly indicates that the consumers' demand is increasing. A decreasing consumer demand is indicated when a given quantity will be taken only at a lower price. The close relation between retail and wholesale prices may be seen in Figure 59.

Many factors may contribute to cause variation in consumers' demand. General business conditions, through influence on pay rolls,

is one factor. In times of prosperity employment is more general and continuous. In such circumstances it is generally assumed that more eggs will be purchased at a given price, or the same quantity at a higher price, than when the reverse conditions prevail.

The price level of eggs is of special importance to the egg industry during the period from March to June inclusive because of the two types of demand at this season. Egg prices usually reach their lowest level during March and tend to maintain an almost horizontal level or to move upward very gradually until June, when a more pronounced upward trend begins.

Spring receipts and United States storage holdings (June 1 or August 1) exert their largest influence on the fall prices of Refrigerator Firsts and on fresh fall eggs. Therefore they serve as an index of the fall situation. When they are large, fall prices of Refrigerator Firsts tend to be low. The relationship between these factors and the fall price of fresh eggs is just the reverse of that between these factors and the price of Refrigerator Firsts in the fall. This is explained by the fact that large spring receipts and storage holdings are associated with low spring prices, restriction of hatchings, smaller numbers of fall pullets, reduced fall layings, and consequently higher prices.

Changes in average monthly prices of eggs result from the joint influence in varying proportions of the many forces reflected in changes in receipts and in storage holdings.

F. A. BUECHEL,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

EXHIBITS for Fairs Give Comprehensive Farm Information The object of department exhibits is to present clearly the newest and most valuable information on agriculture. Every principle of illustrative art is employed to present the facts vividly and persuasively. The designer, the engineer, the woodworker, the machinist, the electrician, the modeler, the artist, all combine their talents to accomplish that purpose. Pictures, diagrams, legends, light, sound, and motion help to portray what department research has discovered to improve and advance agriculture.

The exhibits are take-down structures, designed and built in articulate parts. They are assembled readily at exhibition points and as readily dismantled and reshipped to other fairs. They are well and strongly built, and by renovation and revision, endure for many showings. The exhibit structures, wherever feasible, are designed to create settings helpful to immediate, clear understanding. How to produce clean milk, for instance, is explained in a representation of a milk house with its equipment and conveniences in place. Right uses of forests for timber, for stream-flow control, for propagation and utilization of wild life, and for recreation, are presented in structures that depict lumbering operations, wooded slopes, hunters' cabins, cool, sequestered wildernesses, or modern forest highways and camps. Stories about 4-H club work, crop improvement, better sires, market possibilities through cooperation, all begin their appeals through familiar settings. Many of the exhibits are operated by electrical and mechanical devices, and many are supplemented by objects and specimens of the things discussed.

The completed exhibits are arranged in convenient groups for shipment to fairs in freight carload lots. Each exhibition group deals particularly with one or more of the major agricultural subjects, but for variety contains a few exhibits on other subjects. In planning exhibition programs, care is observed to provide fairs with exhibits on agricultural enterprises that are important in the regions served by the fairs, and on those phases of the subject that will be most useful. Department publications which offer additional information on the subjects presented in the exhibits are furnished for distribution in connection with the displays.

A carload of exhibits when installed occupies from 100 to 140 running aisle feet of floor space about 10 feet deep, or from 1,000 to 1,400 square feet, depending, of course, upon the size of the group. The exhibits provide their own structures and wall displays and can be installed in almost any type of space. It is not necessary that space be in unbroken lines. The exhibits can be set up along two or more sides of an aisle, in hollow rectangle back to back, two ways from a corner, and in other and more varied arrangements.

FIGURE 60.—Exhibit structures are designed to create settings helpful to immediate, clear understanding

Funds Appropriated for Specified Purposes

The regular educational exhibits of the Department of Agriculture are prepared and displayed by the department Office of Exhibits under an appropriation that provides specifically for exhibitions at State, interstate, and international fairs. The Office of Exhibits does not have funds for exhibitions at any other types of occasions. The exhibits are available, therefore, to State, interstate, and international fairs that apply for them and that subscribe to the regular cooperative agreements.

Each Department of Agriculture exhibition is conducted under a cooperative arrangement that makes it a joint enterprise with the fair.

The department furnishes the exhibits and provides personnel for their management and demonstration. The fair provides for the transportation of the exhibits; bears the cost of drayage at the exhibition point; furnishes space, common labor for installing and dismantling the exhibits, and such electrical and other special services as may be required to accomplish a successful display.

The transportation cost is the same for all fairs regardless of distance, the amount being determined by estimating closely the total charges on shipments of exhibits to all of the fairs tentatively scheduled in the season's program throughout the United States, and dividing the sum equally by the number of fairs. Full advantage is taken of all railroad tariffs that provide for the movement of exhibits at reduced rates.

FIGURE 61.—Photography, modeling, painting, carpentry, and mechanical and electrical work were required to produce this mechanical man that milked a mechanical cow

Representatives to supervise the installation, presentation, and dismantling of the exhibits are sent to the fairs at the expense of the department. Demonstrators are carefully selected with regard to their experience in department exhibit work, as well as to their knowledge of agricultural subject matter and their tact and ability to cooperate.

Shipment In Carload Lots

Shipments move in carload lots over complete circuits. Occasionally a fair may not have room to display all of the items in a group. The extras are then stored at the exhibition point until the close of the fair and reloaded with the material actually shown. It is not practical to break groups or to combine selections diverted from two or more groups. Freight rates are higher for less-than-carload lots and idleness would be enforced upon the unused portions of the groups which would reduce the number of exhibitions that could be made during the limited period of the fair season. Sometimes, however, it is possible to provide a fair with more than one group if desired. In that event, the fair cooperates to the extent of a share of the transportation cost and the other cooperative conditions for each group.

When a group of Department of Agriculture educational exhibits is desired by a State, interstate, or international fair, application should be submitted to the Office of Exhibits, United States Department of Agriculture, Washington, D. C. The application should state the general agricultural subjects that are best suited to the region served by the fair and upon which exhibits would be most helpful. It should indicate, likewise, information concerning the amount of space for

which exhibits are desired and whether the fair is in position to meet the cooperative conditions under which the exhibits are available.

George H. Cook,
In Charge Exhibition, Office of Exhibits, Extension Service.

EXTENSION of "Outlook" Information to Farmers Meets Practical Need

One of the chief problems of the farmer has been a lack of economic facts that would be helpful in planning and operating his business. The aim of every successful farmer is to make his management represent his best thought. To do this, his first task is to think his problems through. The extent to which farmers know the facts of their business and relate these facts to "outlook" information as a basis of each future year's operations is closely associated with the degree of success attained.

The agricultural-outlook work is an attempt to help farmers in the analysis and interpretation of available facts bearing on conditions that will probably be encountered when products of the coming season's operations are ready for market. The outlook extension work, therefore, involves two considerations: (1) Helping farmers make a more careful study and analysis of their individual business as a basis for finding the strong and weak points, and (2) supplying farmers with outlook and other timely information for use in deciding whether to change the acreage of crops or numbers of livestock ahead of planting or breeding season.

The attempt is made to give outlook information in terms of both local and national conditions, since farmers have both local and national problems to consider. It is supplied through published reports, meetings, news articles, radio, and other means.

Two rather distinct considerations are included in the extension plans for the outlook educational program. The first includes a program designed to assist the farmer in obtaining better knowledge of price and production changes, supply and demand, and the related economic factors. This is essential as a forerunner of other work. It helps the farmer to understand the application of timely economic information to problems that arise throughout the year. The second consideration is that of supplying farmers with the outlook information at timely periods. The wide diversity of commodities and conditions throughout the United States makes this a perplexing problem. Experience in this connection suggests that outlook material to be of most value should be interpreted in terms of specific regions.

Steps In Outlook Extension

The plan for extending outlook information varies among the States, because of differences in conditions. Following are some of the important steps used in organizing and conducting this work in a number of States:

Cooperation of extension and subject-matter workers in getting material in usable form.

Conference of extension specialists and supervisors for study and discussion of outlook material and the uses to be made of it.

Discussion of outlook material and plans for using it by county agents and other workers at annual conferences or at special conferences called.

Holding of regional and local outlook meetings. Making outlook material a part of subject-matter meeting programs.

Furnishing county agents with plans, lecture outlines, charts, and news articles. Giving wide publicity through the press.

Securing cooperation of farm organization officials, Smith-Hughes teachers, bankers, and others.

Appointing and training local leaders.

Making the outlook work a continuous project. Placing increased emphasis on the timeliness and adaptability of commodity data and on the relation of all extension work to the agricultural outlook.

A summary of the accomplishments of the Extension Service in extending outlook information during 1928 is as follows:

State Outlook Reports

In addition to the national outlook reports, 38 States prepared reports. The New England States jointly prepared a regional report. Reports from 31 States showed a total of 257,418 copies of outlook reports distributed. Of these 90 per cent represented State publications. There were 632 meetings conducted by specialists and 643 by county agents with a total attendance of 68,921. The number of all other meetings at which outlook material was used was 1,265, attended by 47,182 people. This makes a total of 2,540 meetings held with 116,103 in attendance. There were 119 economics specialists and 175 other specialists who participated in the work.

A total of 1,419 counties in these 31 States were reached specifically with outlook information. In 828 counties, outlook meetings were held, and in 1,051 counties the county agents are making continuous use of outlook information. A total of 175 radio talks on outlook were given in these 31 States. Many States are continuously disseminating outlook information and thereby reaching many thousand additional farmers through regular production meetings.

Some examples of how farmers use outlook material are also becoming available. Information from the college of agriculture includes the statement that a farmer in Massachusetts, who has grown much tobacco in years past, increased his potato acreage and decreased tobacco for two years previous to 1928, because of a more favorable outlook for potatoes than tobacco. In 1928 he increased tobacco and decreased potatoes, because of a reversed situation. He is now increasing his dairy, as he feels that less dependence should be placed on cash crops than formerly. Another farmer, in North Dakota, wrote the college of agriculture as follows:

> I have been studying your outlook report quite closely during the past year and have found the information contained therein to be of great value to our farming business. Anyone whose interest lies in the marketing of farm products can well afford to make use of this official information as it is released in this bulletin, if he desires to market his products intelligently and reap the greatest profit. I can see no way in which this can be done unless the farmer has some way of knowing something about the supply and demand of the agricultural commodities.

The important thing is that farmers in increasing numbers each year are making careful study of their individual business and better use of outlook and related data. "Know all the facts, then go ahead" is the slogan that quite aptly fits the idea back of this type of extension work.

Outlook extension work, although comparatively new, has demonstrated its worth and its place in the program. With the addition of

outlook and related economic information in his program, the county agent is in a better position to advise with farmers regarding what to produce, how much to produce, and how to produce it efficiently.

H. M. Dixon,
Senior Farm Economist, Extension Service.

FARM Home Makers Get Little Aid in Housework from Others in Family How much help does the farm woman receive in her home making? Does her husband give much time to assisting with household tasks and minding the baby? Do the children give mother a hand? Is a hired girl frequently employed to lighten the work?

A study recently made by the Bureau of Home Economics answers these questions, at least for 559 farm women who cooperated in the study. Each one of these home makers kept a careful record for a week of the time spent in different home-making jobs by every person in her household, including herself. The results make it clear that the work of the home is no longer a family affair. Almost all of it falls to the lot of the home maker herself. While these farm women spent 51¾ hours a week on the average in home-making tasks, only 9¼ hours a week were spent by all other persons in their households.

Most of this help, of course, came from members of the family—7¾ hours a week in the average home, or a little over an hour a day. Only 1 hour a week was given by hired help, and the remaining half hour came from guests in the home.

Who were the members of the family giving this slight amount of help? Just 2 hours a week were contributed by the farmer himself, 4½ hours by daughters and other women relatives in the home, and 1¼ hours a week by sons and other men relatives.

Much Variation in Help Received

These figures, however, are averages for all of the 559 households. Naturally many of these farm women received less help than 9¼ hours a week, and some received much more. One home maker, in fact, was blessed with 111 hours of help during the week, or almost 16 hours a day. But this was a most unusual household, with five children under 10 years of age and a hired girl and a hired man to come to the mother's assistance. In the great majority of cases the amount of help given the housewife was very small. Only 70 of the women received as much as 3 hours a day, and in contrast with these were 99 who had no aid whatever during the week of their records.

How much help a particular home maker received depended first of all, of course, on whether she had a hired girl. But only 29 of these housewives employed any paid help whatever, and half of these had less than 7 hours a week. Only 6 home makers, in fact, had full-time hired help.

A daughter of high-school age or over, or a sister or other woman relative living in the home, was the housewife's next best chance of assistance. Just 103 of the group had help from this source; but again the amount of time which each helper gave was small, averaging 13¾ hours a week for the women of 20 years of age or over, and only 10¼ hours a week for daughters of 15 to 19 years. For younger daughters,

the figures dropped still lower—to 6 hours for girls of 10 to 14, and to 3¼ hours for girls of 6 to 9.

The men of the household, as would be expected, made an even poorer showing. Two-thirds of the husbands lent a hand in some phase of housekeeping, but the amount of help which they gave made but a small dent in the volume of work to be done—3 hours a week on the average. The sons who helped gave still less time, even the older ones averaging less than 2½ hours a week. The little boys under 6 were the only ones to keep up with their sisters of the same age, the youngsters of each group doing their bit to the extent of about an hour and a quarter a week. In 30 cases the hired man also joined in, spending 2 hours a week on the average on household jobs.

Degree of Need Not a Big Factor

Whether the home maker needed help or not had little effect on the amount which each member of the household gave. Even when there were several small children to be cared for, the husband and the older children spent scarcely any more time than when the home maker had an easier job. It was the number of persons in the household old enough to share the work that determined how much help she received, not the quantity of work to be done, and especially it was the presence of another woman or older daughter.

Take, for example, the 24 home makers who received the largest amount of help—more than 5 hours a day. Twenty-one had the assistance of a hired girl or a daughter or other woman relative over 14, from whom most of the help came. And even in the 3 remaining households the chief helper was a young daughter. In 2 a girl of 12 gave almost all the help, and in the third a daughter of 8 gave half, while her 5 brothers and her father together contributed the other half. At the other extreme were the 99 home makers who received no help at all. For 75 the reason is clear—they had families of men and boys only. And in all but 7 of the other households the daughters were all under 10.

What is the explanation of the small amount of help which the men of the family gave—when they gave any whatever? A glance at the kind of work they did gives the answer. Their main job was carrying wood and caring for fires, and when there was water to be pumped or carried, this chore, also, usually fell on masculine shoulders. For the most part, that is, they were called upon for jobs which take very little time, even in a large household. It was the meals, the cleaning, and laundering which formed three-fourths of the work, and in these jobs it was usually only the women and girls who were expected to help. When there were no such helpers in the household, these tasks were apparently still thought of as women's work and left in the hands of the housewife herself, no matter how heavily burdened she might be.

Care of Little Ones Wholly Mother's Job

As for that other phase of home making, the care of small children, it remained almost wholly in the mother's hands, even when there were daughters or other women who might have relieved her. If she had any help from her family, she used it mainly to lessen the time which she herself spent in the housework. Only two-fifths of the 181 mothers

with children under 6 had any help in dressing and bathing and "minding" the youngsters. And even for these the assistance amounted to only 3½ hours a week. In the 17 households where there was a baby less than a year old, however, the family made a better showing. Fourteen of the mothers had some help, and the average amount was about 6 hours a week.

As for the father's share in the care of the children, only one-fourth of those with children under 6 were credited with any assistance, and the average amount which these 44 gave was but 2½ hours a week.

The picture of the situation in regard to help which these 559 farm homes present can not, of course, be taken as representative of all the farm homes of the country. The number is too small to justify general conclusions. But it is interesting to note that the main outlines of the picture are the same when the records from different sections are studied separately. The largest group, 248, came from California, 112 from the Middle West, 107 from New York State, 42 from the South, and 40 from Idaho, while the remaining 10 were scattered over various States. Altogether 25 States were included in the records.

RUTH MOORE,
Junior Home Economist, Bureau of Home Economics.

FARM Incomes Averaged $1,840 Per Farm Yearly in Period 1924–1928

The economic data of the United States Department of Agriculture now include for the first time estimates of the agricultural income in each State. During the summer of 1929, the Bureau of Agricultural Economics completed estimates of gross income from farming and cash income from farming for each State for each of the five years, 1924 to 1928, inclusive. The estimates are published elsewhere in this volume.

The bureau has made and published [6] estimates of the income from agricultural production for the entire United States for each year since 1919. These estimates were based on national data on production, sales, and prices. The bureau has also collected reports of incomes from 6,000 to 16,000 individual farmers scattered throughout the United States each year since 1922 and has published [6] a compilation of the reports for the entire country and for the main geographical divisions. This information has been valuable in appraising the agricultural situation and in judging for the country as a whole the improvement or retrogression in agricultural conditions from year to year.

It has always been recognized that agricultural incomes vary markedly from State to State, from season to season, but suitable measures of the variations have not been available. Many rough indications have been used, such as crop-condition reports, prices of principal commodities, sales of mail-order houses, and even reports from local observers. These rough indicators have been useful for commercial purposes. The bureau estimates now provide means for comparing the gross agricultural income and the cash income from sales of farm products; that is, the annual results of farm operation on the revenue side, State by State, and year by year, since 1924.

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[6] Summary tables are included in the statistical section of this Yearbook. Annual reports in somewhat greater detail may be found in Crops and Markets.

Method Followed in Obtaining Figures

The method followed in obtaining the figures was to estimate, on the basis of all available information, the quantities of the various crops and livestock sold by the farmers in each State each year, the average prices received, and the quantities used for consumption in the farm home and their value. The total value of the crops and livestock sold is called cash income. The cash income, plus the value of the crops and livestock consumed in the farm home, is called gross income. Money income of farmers from activities or investment other than those connected with the farm have not been included in cash income, though such is known to be a considerable share of the income of many farmers in most localities. Nor has the value of the house rent been included in the estimate of gross income. Changes in real estate values, moreover, which have made and ruined many farmers in past years, have purposely been omitted from this set of computations.

Interest centers on net income rather than on gross income. Thus the figure that would depict the situation most accurately would be the difference between gross income and the cost of all the goods and services that are used in farm production. To find this difference it would be necessary to make estimates of the cost of feed, fertilizer, machinery, hired labor, taxes, and all the other items of expense in farming. At present, information is not complete enough on most of the expense items to enable us to make reliable estimates of expense items for each State each year, and the preparation of estimates of net income by States must await the obtaining of much information not now available on the expenses of farming. Until estimates of net incomes are completed, figures of gross income will serve to indicate major annual changes in results of farming—the summation of all the individual increases and decreases observed in farming conditions and the agricultural situation—in the different States and regions. In States where average gross incomes are high expenses of production tend to be high also.

Food Used by the Farm Families

Food used by the farm family represented about 15 per cent of the gross income per farm and amounted to about $280 at farm prices per year during the period. The computed average for 1928 was highest for Arizona ($399) and lowest for California ($145). The average was $389 for West Virginia, $306 for Iowa, $278 for Maine, $244 for Arkansas, $223 for Utah, and $205 for Mississippi. Food used by the farm family was a higher percentage of gross income in the Southeastern States, where it ran above 19 per cent, except in Florida, than it was in the Northern and Western States where it fell below 15 per cent in most cases. In the far Western States less than 10 per cent of the gross income was accounted for as home-grown food used by the farm family.

Annual average gross incomes in the 5-year period show ups and downs in most of the States. California and Wyoming have shown improvement each year. Gross income per farm for 1928 was 24 per cent larger than for 1924 in California, and nearly 14 per cent larger in Wyoming. Maine in 1928 had 42 per cent less gross income than in 1925, the best year there, most of the difference attributable to crop values. North Dakota gross income dropped 30 per cent in two years,

but this resulted from reduction of 51 per cent in gross income from crops only partly offset by a 39 per cent increase in gross income from animal products. In Texas the worst year followed the best year (1924) of the five. In nine States 1928 was the best year of the five from the viewpoint of gross income, whereas, in seven States 1928 was the poorest year. In general, income from animal products ran more even from year to year than income from crops.

Average Gross Income Per Farm by States

The average gross income per farm in each State for the five years, 1924 to 1928, is shown geographically in Figure 62. These figures represent the value of sales per farm plus the value of farm products used in the farm home, and have been obtained by dividing the gross income in each State, as estimated by the bureau, by the number of farms in that State, as determined by the 1925 census of agriculture. The average gross income per farm varied from more than $5,000 a year in Arizona and Nevada, where livestock production on a large

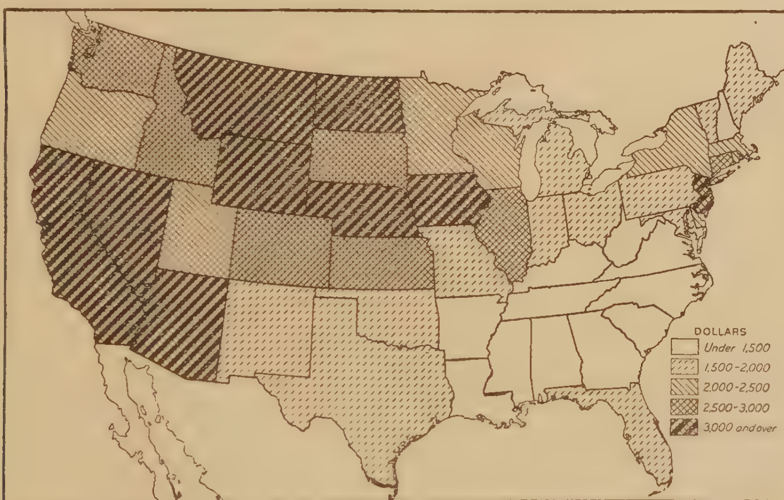

FIGURE 62.—Annual gross income per farm, 1924–1928

scale typifies the agriculture, to less than $1,000 a year in Tennessee and Kentucky, where there are a great many relatively small farms on land poor and difficult to work—land the owners of which must either accept a low standard of living or supplement their incomes by working away from the home farm or at other occupations.

Differences in the average gross income per farm are not explainable on any single basis. For example, the $660 excess in gross income per farm in Nebraska over Kansas is associated with 25 per cent larger farms, higher property values, more livestock, less wheat, more sugar beets and potatoes. On the other hand, greater expense per farm in Nebraska than in Kansas, indicated by the expenses for the four items reported for 1924 in the census of agriculture, would probably materially reduce the difference between the net incomes per farm in these two States. Similar considerations apply to the differences between other States usually considered to be in much the same agricultural situation.

Average Value of Farm Property

Average value of farm property January 1, 1925, as reported by the census varied from $2,107 for Alabama to $26,240 for Iowa, and averaged $8,949 for all farms. The average gross income per farm in Alabama was 49 per cent as much as the value of farm property; in Iowa it was only 13 per cent; the United States average was 21 per cent. Except in a few of the Southern States gross income per farm is rather closely associated with average value of farm property, the higher the value the higher the gross income, the percentage fluctuating between 13 and 30 per cent.

These computations are at present necessarily based on figures applying to the several States. Variations in gross farm incomes within States are known to be large, the averages for the better parts being much larger than the averages for the less favored parts. Reporting on other than State areas must await improvements in the means of distributing data to subdivisions of the States.

H. R. Tolley,
Assistant Chief, Bureau of Agricultural Economics.

FARM Realty Value Down 1 Per Cent for U. S. in Year Ended March 1, 1929

Farm real-estate values, averaged for the entire country, showed a further decline during 1928 and the early months of 1929. The year's losses, however, were comparatively slight in those States in which declines took place, and for the country as a whole the net result was a loss of only about 1 per cent. In 1927–28 the corresponding loss was 2 per cent; in 1926–27, 5 per cent. This continuation of the characteristic downward trend of recent years brought the average acre-value of land and buildings for the United States on March 1, 1929, down to a position 16 per cent above the average for 1912–1914 taken as pre-war. This represents a position slightly below that shown for 1917. At the top of the boom in 1920 the corresponding figure was 70 per cent above pre-war. On the basis of its purchasing power (that is, making allowance for the depreciated dollar), the average value of farm real estate for the United States during 1928 and early 1929 continued to remain some 20 per cent below its pre-war position.

The Department of Agriculture's survey of the farm real-estate situation, which is made annually in March, showed that average values declined in 28 States during the 12 months ended March 1, 1929, remained unchanged in 16, and increased in 4. The increases, which were each about 1 per cent, were confined to 4 of the far Western States. Six of the 16 instances of unchanged values were also found there; 6 more of them were found in New England and in New Jersey and Delaware; the rest were scattered. The States of the Middle West and South rather generally showed declines, but nearly all the declines were small in amount; very few of the sharp annual losses so frequently found in preceding years took place.

The increasing number of instances of unchanged values, and of a progressively smaller size of the losses in States where the annual declines in recent years have been large, encourages the view that values have gone through their big readjustment in response to the

violent wartime distortions of the Nation's whole price system and that henceforth changes will be comparatively slow and small. The readjustment to date has been drastic, for values now are at or below pre-war in several of our richest agricultural States.

TABLE 7.—*Voluntary sales of farm real estate: Percentage of purchasers reported in specified classes of residence, and occupation, and purpose of purchase, for the United States and geographic divisions, 12 months ended March 15, 1928 and 1929*

Geographic division	Residence				Occupation						Purpose			
	1928		1929		1928			1929			1928		1929	
	Local	Not local	Local	Not local	Active farmer	Retired farmer	Other	Active farmer	Retired farmer	Other	For operation	Not for operation	For operation	Not for operation
United States	84	16	84	16	80	5	15	78	4	18	84	16	83	17
New England	61	39	57	43	66	3	31	62	2	36	82	18	85	15
Middle Atlantic	75	25	77	23	65	5	30	67	4	29	83	17	85	15
East North Central	85	15	86	14	78	5	17	73	6	21	83	17	82	18
West North Central	88	12	88	12	86	6	8	82	5	13	85	15	84	16
South Atlantic	80	20	82	18	79	2	19	74	3	23	81	19	81	19
East South Central	87	13	87	13	79	2	19	78	2	20	85	15	82	18
West South Central	81	19	80	20	77	7	16	75	3	22	76	24	76	24
Mountain	81	19	86	14	92	1	7	91	1	8	91	9	91	9
Pacific	75	25	72	28	77	4	19	82	2	16	87	13	91	9

In general, the farm real-estate market continues to remain inactive, dealers reporting voluntary transactions at a minimum. Although generally below normal in volume—in many localities hardly enough to give a basis for estimating a "market value" according to reports—a few apparently voluntary sales are being made. According to information furnished for several thousand typical individual sales by correspondents of the Department of Agriculture, buyers in these transactions were largely residents of the county in which the farm was located, or of an adjoining county. Most of the purchasers were active farmers. Most of them bought for active operation either by themselves or their children. A degree of variation in these relationships occurred as is indicated in Table 7. In the New England and Middle Atlantic divisions, larger proportions of reported purchases attributed to persons not local residents and not active farmers will be observed. The bulk of these came from the larger cities.

E. H. WIECKING,
Agricultural Economist, Bureau of Agricultural Economics.

FARMERS Numerous in Throng of Motorists That Camp in Forests

The scene is any mountain road through Colorado and Wyoming; the time any day during July and August. There is a steady stream of cars in both directions. Some of these motorists are ascending one of the dozen passes over the Continental Divide in Colorado to see the wonders of the western-slope country. Others have camped and fished in that region and are returning.

On Berthoud Pass, which is one of the main highways, from 300 to 1,000 cars pass in each direction daily. There are, of course, more

local cars from the surrounding towns and rural regions than from any other source. Next in point of numbers are those bearing the license plates of Kansas, followed by Oklahoma, Nebraska, Texas, Illinois, Iowa, and South Dakota.

Most of the out-of-State cars and many of the locals are loaded with baggage, bedding, and tents, and these cars carry the people who are camping in the national forests. Most of them are browned and hardened, and it is quite evident that they have come from the farms of the Plains States. They do not speed through the country aiming to make some town or city by night. Instead, they proceed leisurely, taking in the scenery, fishing in the mountain streams, and camping where night overtakes them, in one of the many camps improved by the Forest Service with toilets, garbage pits, and fireplaces.

FIGURE 63.—Lodge-Stockton's Silver Lake camp, Eldorado National Forest

383,670 Campers in National Forests in 1928

During 1928 the national forests in Colorado, Wyoming, and South Dakota were used by 383,670 campers. In addition, 319,665 people picknicked in the national forests of these States. Many of these people came from neighboring towns and cities, but at least one-fourth were farmers.

In addition to the recreation which he enjoys the farmer sees timber cut conservatively so that the run-off, after heavy rains, may not start erosion and silt up streams, reservoirs, and valuable farm lands. At the higher elevations in the forests he can see snow banks which form the bulk of the water supply for the irrigations of August and early September. Timber is being sawed into lumber at the local mills; railroad crossties, telephone poles, and mine props pass him on their way to market. He sees cattle grazing in the aspen and open mountain meadows and occasionally a band of sheep grazing on some distant hillside near timber line.

He may, perhaps, happen to run onto a group of cabins above a lake or on a sidehill, well concealed from traffic cut with a commanding view of a valley or a mountain range. A sign states that this cabin is occupied under special-use permit issued by the Forest Service. Upon inquiry the farmer discovers that he too may build and occupy a summer-home cabin and that many lots have been surveyed and are waiting for applicants. Possibly he may select a lot and build

a cabin, as many farmers have done. Each summer he may bring his family to this cabin which he can gradually fix up with the com-

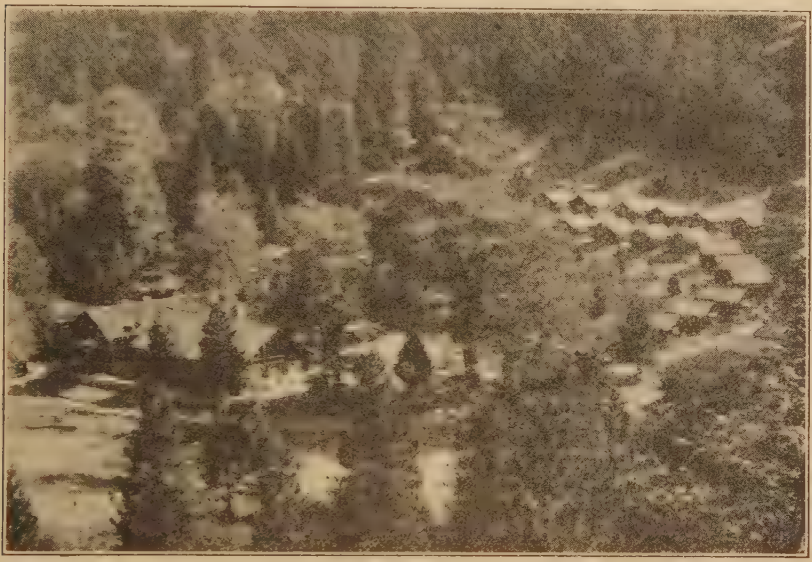

FIGURE 64.—Los Angeles' Camp Seeley—the first municipal camp to be established in the national forests of California, San Bernardino National Forest

FIGURE 65.—Cabins at Los Angeles' Camp Seeley, San Bernardino National Forest

forts of home so that he can enjoy a real rest and vacation without the hardships and uncertainties of camp life.

F. R. JOHNSON,
Technical Assistant, Forest Service

FEED Marketing Has Changed Materially in Last Six Years Many changes have occurred in the marketing of feed with the reorganization of general business during the past six years. These changes have pertained particularly to the manner of commodity merchandising and distributing. The method of marketing mill feeds has not escaped this change in the order of things.

Prior to about 1922-23 by far the bulk of the output of mill feeds was handled through jobbers and brokers in producing markets, who, in turn, sent these feeds on through jobbers and brokers in distributing markets. That is, flour mills, flax crushers, corn mills, etc., were primarily interested in disposing of their principal manufactured product; disposal of their by-product feeds was looked upon more or less as a side issue. By-product feed was virtually turned over to the jobbing trade and no particular endeavor was made to send it in smaller parcels direct to the country dealer, distributor, or mixed-feed manufacturer.

With more intense competition between flour manufacturers and with the changes incident to the use of more modern methods of manufacturing, merchandising, and distributing their principal product, the mills gradually began to show as much careful business interest in disposing of their by-products as they did with the flour. Salesmen who were previously often instructed to confine their efforts to selling flour, were instructed to sell feed as well and to push feed sales in an endeavor to get as much tonnage booked direct to the flour and feed dealer as possible.

Influence of the Mixed-Feed Industry

Growth of the mixed-feed industry is another important factor in the changing situation. Feeders, generally speaking, have gradually made a more careful study of the problems of animal nutrition, and a larger and more steady demand has developed for balanced feed rations and mixtures in which by-product feeds may be profitably used. Although mixed-feed plants have always used large tonnages of wheat mill feeds, it was formerly customary for them to obtain their supplies chiefly from the jobbing trade, as the jobbers both in producing and distributing markets usually had bought up the bulk of the mill output for the season. As flour mills realized that a large percentage of their by-product output eventually found its way to the mixed-feed plants, they began catering to this business direct. Soon mixed-feed manufacturers were offered feed by mills on a more attractive basis than they could obtain from the jobber. Among the reasons were the facts that the credit risks were better, shipping instructions were more likely to be furnished as needed, and in most cases feed sold direct to the mixed-feed manufacturer would be taken off the resale market.

With the growth in demand for mixed feeds, flour mills began to manufacture commercial mixed feeds on a large scale. This has curtailed the tonnage of wheat mill feeds placed on the open market. Mills entered this new activity by remodeling their facilities to meet the mixed-feed trade requirements and in some instances, they purchased outright some of the larger mixed-feed companies and merged them with their own concerns.

Development of cooperative buying agencies, who have directed their inquiries directly to mills, has also been an important factor in causing this change in the channel of distribution. Formerly coop-

erative buying agencies, particularly those that were farmer-and-feeder controlled, were small and they directed their inquiries to their local jobber or wholesale feed dealer. Many of these agencies are now large organizations and they obtain their feed direct from mills whenever possible.

Establishment of buying agencies by large handlers of mill feeds has also made for more direct contact with mills. Many of the larger distributors and feed manufacturers now have their own buying agents at main producing markets who are in daily contact with mills. In this way they buy much of the feed direct that previously went through the jobbers' hands.

Many feed manufacturers, as well as wholesale flour and feed dealers, have established chain stores for the distribution of their feed, flour, and allied commodities. In many instances the chain-store unit has supplanted the local retail feed merchant, who previously bought the bulk of his requirements from a near-by distributing wholesaler, or from a jobber. Now, with one organization buying for an entire chain, this business is directed so far as possible to the manufacturer.

Mill by-product feeds have merely followed the trend that has taken place in practically all lines of commercial endeavor; that is, to put the commodity at its ultimate destination via the shortest route.

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FEEDS for Livestock May Sometimes Require Special Preparation For centuries livestock lived mainly by shifting for themselves. At times some received harvested feed to help carry them through the winter, but the chopping or grinding of roughages for livestock was unheard of and the milling of grain was a slow, laborious process limited to grain for human consumption. Fattening livestock with grain on an extensive scale began, in the United States, with the settlement of the eastern part of the Corn Belt, early in the nineteenth century.

For many years shock corn was the mainstay of the feed lot. The first step in feed preparation was the breaking of ear corn. During much of the latter part of that century corn was so cheap that there was little or no incentive to use the by-products of flour and oil mills and packing houses.

Soaking, Cooking, and Grinding

Then as feeding became more largely a farm than a range operation, a strong demand developed for ways of getting more value from the feed. Soaking, cooking, and grinding were tried. In general, the extra labor added much to the cost of the feed and sometimes the feed was even less valuable on account of the process.

As soaking is a disagreeable job and renders some feeds less palatable, besides increasing the possibilities for spoilage, it has proved to be, on the whole, an undesirable method of preparing feed. It may be used, however, for small or flinty grains when grinding is not practicable.

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Cooking adds to the palatability of many feeds but it is generally quite expensive on account of the equipment, fuel, and labor required, and is therefore a wasteful practice. Consequently, it is recommended only in exceptional cases, such as with potatoes and beans for hogs.

Grinding does not increase the digestibility or nutritive value of feeds which can be thoroughly masticated. However, small hard-coated grains, such as rye, wheat, barley, and grain sorghums, should be ground or rolled. As the purpose of grinding is to break the outer seed coats, which resist the digestive and assimilative processes, coarse grinding or rolling is preferable to fine grinding. Finely ground grain is objectionable for the following reasons: Its grinding requires much more power than is required for coarse grinding, it heats and spoils readily in the bin, thus becoming less palatable and nutritious, and it has a tendency to form a pasty mass during digestion.

FIGURE 66. Saving labor by fattening steers on ear corn in a self-feeder. Hogs utilize the waste feed, including that in the cattle droppings

The grinding of grain may be justified also for livestock having poor teeth, for horses doing extremely hard work, and for cows producing milk in large quantities.

In fattening cattle, if ear or shelled corn makes up a large part of the ration, many whole kernels may pass through the digestive tract. In such cases putting hogs with the cattle is generally more economical than grinding the grain. (Fig. 66.)

Quality and palatability determine to a large extent whether roughage should be ground or chopped. If hay is of such good quality that practically all of it is readily eaten, there is no appreciable advantage in putting it through a mill. (Figs. 67 and 68.) Much hay is so stemmy that a large percentage of it, principally the stems, is not eaten by livestock unless they are starved to it. As such measures are rarely profitable, grinding or cutting may be employed to make all parts of the hay edible. Such procedure is profitable when the value of hay saved is greater than the cost of grinding.

FIGURE 67.—Alfalfa hay fed to brood sows adds bulk to the ration and is an excellent source of protein, minerals, and vitamins

Costs of Cutting and Grinding Hay

According to several trials by the South Carolina Agricultural Experiment Station, the cost of grinding hay is $2.21 a ton. It should be kept in mind, however, that the refused stems are much less valuable than the finer parts which are readily eaten. Several analyses indicate that alfalfa stems are about 50 per cent crude fiber. This puts them in a class with the straws which have such a low net energy value that they are fit for use only when a very low plane of nutrition is economical or when it is desired to increase the bulk of the ration. The dust incidental to grinding hay is very objectionable both at the time of grinding, on account of the danger of explosions, and also at the time of feeding, especially where milk is produced for human consumption. Chopping or cutting hay may produce appreciably less dust than grinding. At prevailing prices for labor, gasoline, and oil,

FIGURE 68.—Racks for feeding grain and fenced runways for feeding hay to lambs in Colorado

and exclusive of charges for depreciation and interest, hay may be cut with a tractor and silage cutter for about $1.50 a ton.

In fattening steers on alfalfa, both alone and with other feeds, cut alfalfa hay produced greater gains than whole alfalfa hay and less of the cut hay was wasted, according to experiments of the Idaho and Oregon stations. Taking the greater gains and less waste into consideration, the cut hay was from 10 to 20 per cent more valuable than the whole hay, which, however, is not sufficient to offset the cost of cutting unless hay is worth $15 a ton or more and can be chopped for about $1.75 a ton. Corn stover and similar coarse roughages may be shredded to make the stalks more edible. Such treatment greatly facilitates the use of the refused parts for bedding and the subsequent removal and spreading of the manure.

Briefly, grinding or similar processes are most valuable in the case of grain which is too hard or too small for livestock to chew readily and thoroughly. Roughages should be ground, chopped, or shredded

when the consumption of the less desirable parts is increased sufficiently to make the operation profitable.

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FERTILIZER Applications That Show Most Profit Are Difficult to Make

It has long been recognized that for any given crop, soil, and climate a certain rate of fertilizer application will be more profitable than any other. When more than the optimum quantity for a specified set of conditions is applied, the increased crop yield produced by it will not pay for the additional fertilizer and, if the excess is large, the yield is likely to be materially less than the maximum.

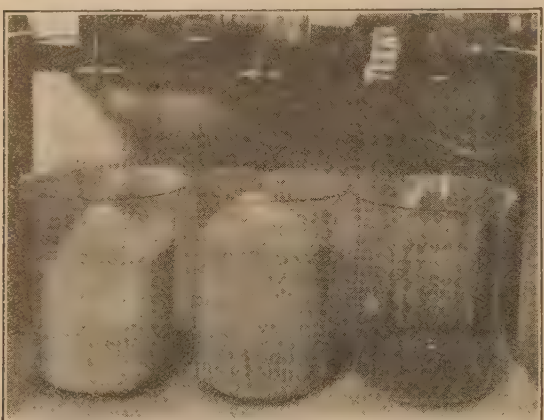

FIGURE 69.—Three units in the distributor shown at the top were partitioned off and calibrated to deliver the same weight of the same fertilizer. The amounts of the three different mixed fertilizers actually delivered show the effect of the properties of the fertilizer on delivery rate

Distributors often fail to deposit fertilizers uniformly and thus some plants may receive much more nutriment than the average, while others receive little or none. Therefore even though the best fertilizer is applied at the optimum quantity per acre the greatest benefits possible from the use of that fertilizer are usually not secured. For maximum profits the best fertilizer must be distributed uniformly in the proper position in the soil in relation to the seed, and at the right rate.

With a fixed adjustment, the delivery rate of most distributors varies with the properties of the fertilizer. The highest delivery rates are obtained with fertilizers that flow best, and solid substances flow most freely when they are composed of spherical grains and are dry. On the other hand, with the same setting distributors generally deliver at a low rate when the material is damp, finely powdered, light in weight in proportion to its bulk or is composed of oblong particles. Thus when the implement is set to apply 800 pounds per acre of one material it is just as likely to distribute 500 or 1,200 pounds of another or of the same one if its "drillability" changes.

The properties of a fertilizer that influence its distribution rate are either inherent in the material or fixed in the process of manufacture, except its dampness. This property, however, varies constantly with changes in the humidity and temperature of the air in which the fertilizer is stored and is especially significant because the delivery rate diminishes rapidly with increasing dampness and when very damp most fertilizers become undrillable.

Methods of Applying Fertilizers

As a rule all that is desired in applying fertilizers is an approximation to a certain rate and this can usually be attained readily enough. When starting to apply fertilizers most farmers adjust their distributors by trial or according to the calibration chart and then change the adjustment from time to time until the rate of delivery appears satisfactory. A better method consists of calculating the desired weight of material for a given number of feet of row, and having tied a container beneath the distributor, operate it over that distance several times, making appropriate adjustments each time until the required rate is obtained. Having calibrated the machine in this way the fertilizer should be exposed to the air as little as possible as changes in the weather will cause it to absorb moisture from the air or to dry out and thus alter the delivery rate.

In practice, irregular distribution usually goes unobserved at the time, because the fertilizer is immediately covered with soil, but it may show up later as gaps in the row where seed were killed by too much fertilizer and as poor growth at other places where the plants received little or none.

FIGURE 70.—A 20-foot section of row placed on a smooth floor showing the cycles of delivery produced by an augur-type distributor with fertilizer in good condition

Some types of distributors can apply dry, coarsely granular material with a fair degree of uniformity but most of them can not distribute damp material uniformly. Irregularity of distribution is at its worst when the fertilizer is damp, lumpy, finely powdered, or composed of very oblong, needlelike particles.

Implements with several delivery units frequently deliver at a different rate from each tube. Changing the depth of the material in the hopper and the tilt of the machine, as well as jolts and side swings all tend to vary the quantity of fertilizer being deposited.

In addition to the difficulties already mentioned some mixed fertilizers tend to separate during distribution. The jarring and swaying to which distributors are subjected and the incessant vibration of some hoppers, especially of the agitator and knocker types, cause the finer particles of fertilizer to sift down between the coarser ones, and the heavy grains to settle more rapidly toward the bottom of the hopper than the light ones. Thus the ratio of plant-food elements delivered may change from time to time.

Fertilizers Vary in Drilling Qualities

When purchasing fertilizer there is often an opportunity to choose between mixtures that are practically identical in plant-food content

and cost, but are very different in drilling qualities. In such cases it will pay well to choose the material that can be distributed best. Most fertilizer distributors do their best work with materials that are fairly dry, free from hard lumps and capable of pouring in a steady stream but which will not flow so freely as to sift through openings in the hopper when the implement is idle.

When such a material is poured slowly into a conical heap the slope of the sides of the pile will make an angle with the horizontal of about 40°. This angle increases with decrease in drillability and most implements fail to distribute satisfactorily materials giving an angle greater than 50° when tested in this way. Mixtures that tend to separate into their components may be detected by half filling a fruit jar and shaking it for a few minutes.

Having purchased a fertilizer of good drillability, it is wise to keep it in that condition. This may be done by storing it in a dry place, preferably on a wooden floor above the ground level, until ready for application. Fertilizers usually become less drillable when stored in the field, as is now often done in certain sections, or in a damp place, or on the ground. If a fertilizer becomes damp in storage it should be dried before distributing it, by spreading it in a thin layer on boards or canvas in the sun and if it becomes lumpy it should be screened, the lumps broken up and then remixed. These procedures are irksome, require much time and labor, and ought therefore to be avoided by proper care in the first place. The humidity of the air is usually lowest from noon until 4 p. m. of sunny days and damp fertilizers dry best and can be most efficiently distributed at such times, although it may not be practicable to limit the work in this way. The points considered above apply to concentrated fertilizers as well as the ordinary fertilizers now generally used.

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FERTILIZER Distributor Operation Affected by Many Conditions The maximum benefit from the application of commercial fertilizers to field crops is to be obtained only when the fertilizer is distributed uniformly at the predetermined rate. The distribution of fertilizers by machine varies with the type of distributor, and is greatly affected by the changing conditions of field operation. Fertilizers in poor condition tend to flow in lumps, and are distributed more or less irregularly by all machines. Fertilizers that flow with exceptional freedom usually give the most uniform distribution, but may be distributed unevenly by certain machines since they respond readily to mechanical irregularities. Any irregularity in the design, construction, or movement of the dispensing member causes impulses of delivery, and several times as much fertilizer may be deposited during one interval as during another. Figure 71 illustrates extremely irregular distribution as sometimes found, while Figure 72 shows the subsequent effect on the growth of plants. Uniform distribution, being most difficult to obtain at the lower delivery rates, is of increasing importance since the trend seems to be toward the use of more concentrated fertilizers.

A number of distributors are so constructed that a fertilizer in good condition will flow by gravity through the distributing mechanism

when not in motion, which may result in the wasting of considerable fertilizer. To obviate this difficulty, some machines are equipped with a flap for readily covering the discharge opening. Distributors having multiple units, such as a grain-drill attachment, do not always discharge equal amounts of fertilizer from all units. When the machine as a whole may be giving the desired rate of application, in extreme cases some rows will receive twice as much fertilizer as others. The usual causes of this variation are differences in the size of the quantity-regulating gates, loose connections in the adjusting mechansim, and partial clogging due to caking of the fertilizer. The operator should examine his machine frequently, to correct any of these faults as soon as they occur. When two or more delivery tubes extend from the same unit, considerable variation in delivery may result. Not only may the quantity delivered by individual tubes differ, but also, because of segregation in the distributing mechanism, the proportions of large and small particles may be different.

FIGURE 71.—Irregular distribution of a fertilizer in excellent condition resulting from characteristics of design of the distributing machine

Depth of Fertilizer in Hopper

The decrease in the depth of fertilizer in the hopper during operation causes a decrease in the delivery rate, especially with a fertilizer that flows very freely. Delivery rate is affected most when the depth of fertilizer is less than the width of the hopper at the discharge opening. Therefore, the hopper should not be completely emptied before it is refilled. In top-delivery types of distributors, depth of fertilizer affects the delivery rate only by compacting the material; the amount of compacting will vary according to the texture of the fertilizer, and usually will be small.

The rate at which distributors that are not entirely positive in their action discharge fertilizer at any particular adjustment is greatly affected by the physical condition of the fertilizer. A majority of the distributors now used are of such types that the delivery rate will be affected materially by changes in the condition of the fertilizer. Since the condition of fertilizer as ordinarily stored is affected by the weather, it may be necessary to change the adjustment of the distributor frequently to maintain the desired rate of application. The use of efficient agitators in the hopper helps to keep the delivery rate constant.

It is not uncommon for a distributor adjusted to deliver 200 pounds per acre of one fertilizer to deliver 400 pounds per acre of another fertilizer of equal drilling qualities. This results from a difference in the weight per unit volume, which varies greatly among fertilizers. The adjustment chart sometimes attached to the machine by the manufacturer is intended only as an approximate guide, for it does not take into consideration either the weight or the condition of the fertilizer. The

operator should test his distributor with each lot of fertilizer received, and check the rate of delivery frequently when much time is required for the application.

Inclining the machine from its normal operating position, as is the case in traveling over sloping ground, affects the delivery rate in most distributors, particularly with free flowing fertilizers. The 1-wheel distributors most commonly used are many times inclined rearward toward the discharge opening by permitting the covering shovels to run too deep. This may more than double the delivery rate with some distributors. If the inclination is away from the discharge opening, the delivery rate will be decreased. Inclination has the least effect on those types of distributors that discharge the fertilizer in a circular band about the hopper, through an opening in the center of the hopper base or from the top of the hopper.

FIGURE 72.—Uneven growth of cotton plants resulting from irregular distribution of the fertilizer

Slippage of Drive Wheels

Rate of delivery also depends upon the slippage of the drive wheels of the distributor. The slippage of the smaller wheels, approximately 15 inches in diameter as used on walking machines, varies from 5 to 40 per cent depending upon the width and design of the tire, the power required to turn the wheels of the machine, and the character of the seed bed. The slippage of wheels 30 inches or more in diameter is much less, and seldom exceeds 15 per cent. Keeping the machine well lubricated and the operating parts clean will reduce slippage.

Among the features of construction that would facilitate the management of distributors are (1) large hoppers and delivery tubes, (2) a graduated or notched scale on the quantity-adjusting device, (3) provision for making comparatively small changes in the delivery rate, (4) means of readily determining the delivery rate, (5) accessibility of the parts for easy emptying and cleaning, and (6) protection of the metal parts from rust and corrosion. To secure most satisfactory operation of a distributor, care should be observed to (1) examine the machine frequently and see that the distributing mechanism is clean and that all parts are in adjustment and well lubricated, (2) adjust the regulating gates according to the kind of fertilizer being used, (3) readjust the regulating gates according to the physical condition of the fertilizer, (4) refill the hopper before the depth of fertilizer becomes small enough to affect the rate of delivery, (5) check the rate of delivery frequently, (6) keep the distributor as nearly level as possible while applying fertilizer, which requires special attention with 1-wheel

machines, and (7) empty the machine entirely at the end of each day's work, to prevent caking of the material and clogging and rusting of the distributing mechanism due to absorption of moisture by the fertilizer.

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FERTILIZER Materials for Cotton Growing Must be Well Chosen Considerable care should be employed in the selection of the soil to be planted to cotton and in the use of commercial fertilizers. Faced by the necessity of having to increase the yield and quality of cotton and lessen the cost of producing the crop, it is self-evident that the selection of desirable soils and the use of the right fertilizers become matters of economic importance.

The use of fertilizers has long been recognized as an especially important factor in cotton production in the Southeastern States. In 1928 there were planted in North Carolina 1,919,000 acres of cotton, and commercial fertilizers were used on 99 per cent of the area, the average application being 440 pounds per acre at a cost of $6.38 per acre; in South Carolina there were planted 2,479,000 acres and 94 per cent of the area was fertilized, the average application being 325 pounds per acre at a cost of $4.44 per acre; in Georgia there were planted 3,874,000 acres and 96 per cent of the area was fertilized, the average application being 262 pounds per acre at a cost of $3.86 per acre; in Alabama there were planted 3,706,000 acres and 93 per cent of the area was fertilized, the average application being 262 pounds per acre at a cost of $4.22 per acre.

FIGURE 73.—Cotton in fertilizer experiment on Norfolk sandy loam. Cotton on left received 900 pounds per acre of a fertilizer containing phosphoric acid and potash and no nitrogen; yield 876 pounds per acre. Cotton on right received 900 pounds per acre of a fertilizer containing phosphoric acid, potash, and 4 per cent nitrogen; yield 1,263 pounds per acre

Investigations by the Department of Agriculture and the State experiment stations in the Southern States have played an important part in furthering the proper use of commercial fertilizers on the cotton crop. Experiments conducted by the department deal with the nutrition of the cotton plant, its response to different forms of nitrogen and potash, to varying quantities of fertilizers, and a study to determine the ratio of nitrogen, phosphoric acid, and potash suitable for cotton on prominent soil types. Most soils used for cotton growing require for normal growth and development, including abundant boll formation and early maturity, a complete fertilizer containing a well-balanced proportion of nitrogen, phosphoric acid, and potash, the formula and fertilizer materials to use depending in large measure on the type of soil.

Principal Sources of Nitrogen for Fertilizer

Sodium nitrate and sulphate of ammonia are the principal inorganic sources of nitrogen materials used in fertilizing cotton. Both are used in mixed fertilizers and may be used alone as side dressing after the cotton is up. Cottonseed meal, fish scrap, dried blood, and tankage are the principal organic materials used. Since the World War a number of synthetic nitrogen salts have become available for fertilizer usage. The principal synthetic nitrogen salts which have been suggested for fertilizer purposes are chiefly urea, ammonium phosphate, ammonium chloride, potassium nitrate, potassium ammonium phosphate, ammonium nitrate, potassium ammonium nitrate, and salts containing two or three plant-food constituents. In addition to these quite a number of commercial materials have been introduced, such as Leunasalpeter, Nitrophoska, Ammophoska, Calurea, Leunaphos, Leunaphoska, and others.

Experiments conducted for several years on 12 soil types in North Carolina and South Carolina show the synthetic nitrogen salts to be good sources of nitrogen for fertilizing cotton when compared with equivalent amounts of nitrogen in nitrate of soda and sulphate of ammonia. The average yield of all the experiments for the various materials used in mixtures with phosphoric acid and potash are given in Table 8.

TABLE 8.—*Comparative effects of nitrogen carriers on yield of cotton*

Source of nitrogen in fertilizer	Yield of seed cotton per acre	Source of nitrogen in fertilizer	Yield of seed cotton per acre
	Pounds		*Pounds*
Nitrate of soda	1, 266	Ammonium phosphate	1, 221
Sulphate of ammonia	1, 263	Urea	1, 210
Ammonium nitrate	1, 248		

The more slowly available organic nitrogen materials are not suitable as the sole source of nitrogen in mixed fertilizers for cotton. They do not supply enough quickly available nitrogen in the early spring when the young plants need stimulation, but furnish it later in the season, which delays fruiting and maturing of the cotton. Nitrogen from organic sources may be used in mixed fertilizers with inorganic or synthetic materials to advantage, especially for sandy soils of the coastal plains. Experiments made on nine soil types on the coastal-plain soils of South Carolina show that better results were secured from a fertilizer containing nitrogen derived in part from inorganic sources and in part from organic sources than from fertilizers in which all the nitrogen was of inorganic source.

Superphosphate is used almost exclusively as the source of phosphoric acid in mixed fertilizers for cotton. It is a quickly available source of phosphoric acid. Ground rock phosphate and basic slag are used to a minor extent, but these materials are applied singly and not in mixtures with nitrogen and potash carriers.

Several potash materials are used in cotton fertilizers, the principal ones being sulphate of potash, muriate of potash, kainit, and manure

salts. Results of experiments made for several years on 12 soil types on the coastal-plain soils and on 6 soil types in the piedmont region in North Carolina and South Carolina are shown in Table 9. Sulphate of potash, muriate of potash, and kainit as sources of potash in complete fertilizers with superphosphate and nitrogen carriers were applied at the rate of 900 pounds to the acre.

TABLE 9.—*Comparative effect of potash carriers on yield of cotton*

Source of potash in fertilizer mixture	Average yield of seed cotton per acre on—	
	12 coastal-plain soils	6 piedmont soils
	Pounds	*Pounds*
Sulphate of potash	1, 231	937
Muriate of potash	1, 210	939
Kainit	1, 135	892

There was not a great variation in yield produced by the sulphate and muriate of potash. Kainit gave somewhat lower yields. The forms of potash have not shown wide variations in yields in these tests.

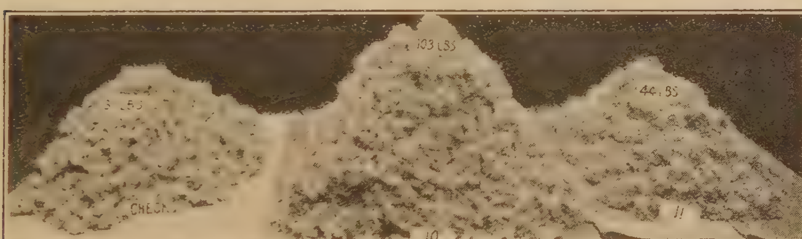

FIGURE 74.—Yield of cotton on Norfolk sandy loam (1/20-acre plots). (Check) Received no fertilizer, yield 620 pounds per acre; (10) received 900 pounds per acre of fertilizer, containing nitrogen, phosphoric acid, and potash, yield 2,060 pounds per acre; (11) received 900 pounds per acre of a fertilizer containing phosphoric acid and potash and no nitrogen, yield 880 pounds per acre

Experiments on Fertilizer Formulas

The Department of Agriculture and the southern experiment stations have conducted numerous field experiments on a large number of soil types to determine the proper fertilizer formula, and from a digest of these results the following conclusions may be drawn.

On the gray sandy loam soils of the coastal plains occurring in the extreme northeastern section of the Cotton Belt including southeastern Virginia and northeastern North Carolina, which normally produce a rank vegetative growth making early maturity an essential factor, a mixture should be used containing 4 per cent nitrogen, 12 per cent phosphoric acid, and 4 to 6 per cent potash. On the lighter soil types in this region where vegetative growth is inclined to be less vigorous, a mixture containing 6 per cent nitrogen, 10 per cent phosphoric acid, and 4 to 6 per cent potash gives best results.

In the case of the heavy clay loam and sandy loam soils of the central coastal plain section, including eastern North Carolina and eastern South Carolina, which normally produce rank vegetative growth,

making early maturity an essential factor, a mixture containing 4 per cent nitrogen, 10 per cent phosphoric acid, and 4 per cent potash is suitable. On the lighter sandy and sandy loam soils of the region, in order to stimulate vegetative growth, a mixture containing 4 to 5 per cent nitrogen, 8 per cent phosphoric acid, and 3 to 4 per cent potash is recommended. On the lighter sandy types of this region from 18 to 30 pounds of nitrogen per acre from materials containing nitrogen in readily available form should be used after the cotton is up.

For the clays and clay loams of the piedmont section of North Carolina, South Carolina and Georgia a mixture containing 4 to 5 per cent nitrogen, 10 per cent phosphoric acid, and 2 to 3 per cent potash gives good results. The sandier types of this region do better with mixtures containing 4 to 5 per cent potash. On the less fertile soils of this region it is considered a good practice to use from 18 to 30 pounds of nitrogen per acre from readily available materials, after the cotton is up.

FIGURE 75.—Representative bolls of cotton grown on soil responding to potash. A, Fertilizer contained 3 per cent ammonia, 9 per cent phosphoric acid, and no potash; B, fertilizer contained 3 per cent ammonia, 9 per cent phosphoric acid, and 3 per cent potash; C, fertilizer contained 3 per cent ammonia, 9 per cent phosphoric acid, and 6 per cent potash

On the coastal plain soils of Georgia, praticularly the heavy, dark, pebbly soils of the Tifton series, a mixture containing 3 per cent nitrogen, 9 per cent phosphoric acid, and 5 per cent potash can be recommended; the gravelly sandy soils of the Norfolk series will respond well to a mixture containing 4 per cent nitrogen, 8 per cent phosphoric acid, and 4 per cent potash; and the red and brown soils of the Greenville and Orangeburg series to a mixture containing 4 per cent nitrogen, 10 per cent phosphoric acid, and 4 per cent potash. On the light porous sandy soils of this region the use of 18 to 20 pounds of readily available nitrogen per acre should be used at the first cultivation of cotton after chopping.

The most profitable quantity of fertilizer to apply also varies with the soil type and farming conditions. On the coastal plain soils applications vary from a very small quantity up to 900 pounds to the acre. In a large number of tests conducted by the department applications of 800 pounds to the acre have been found profitable. On the soils of the piedmont less fertilizers are used where applications of from 600 to 800 pounds to the acre have been found the most profitable.

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FERTILIZER'S Value Measured in Tests in North Carolina Some methods of increasing yields per acre, such as the adaptation of crops to soil types, the rotation of crops and the use of improved varieties of seed, involve no additional costs; others require increased expenditure, as spraying for insect control, better preparation of soil and cultivation of crop, and application of fertilizers. Often without this extra expenditure no profit can be made, if indeed an actual loss does not result.

So many factors are involved in growing a crop that well-planned experiments are necessary to determine the effect of fertilizers. As an example of the increased yields obtained from fertilizer, experiments under controlled conditions on cotton conducted by the North Carolina Experiment Station in cooperation with the United States Department of Agriculture may be cited. On Portsmouth sandy loam the check-plot yield was 588 pounds of seed cotton; 150 pounds of fertilizer increased the yield 199 pounds and 900 pounds of fertilizer increased it 952 pounds. On another type of soil 800 pounds of fertilizer increased the yield 834 pounds. This would indicate that at these applications for 1 pound of fertilizer used approximately 1 pound of seed cotton was obtained. The curves shown in Figure 76, however, constructed from data in the North Carolina report, show slightly diminishing increases with increasing amounts of fertilizer applied. The increased yield, for example, from 300 pounds of fertilizer on Ruston sandy loam is 308 pounds and for the next 300 pounds of fertilizer is 240 pounds and for the third 300 pounds is 189 pounds. This illustrates the law of diminishing returns, which in practice means that fertilizers can not be applied indefinitely in increasing amounts with profit, since the increases derived from successive amounts become smaller. In the great majority of cases, however, the applications of fertilizers are too small to produce the maximum profit from their use. The data given above show that the use of land has been more effective, since with fertilizers applied crops were obtained two to four times as large as on the same area of unfertilized land.

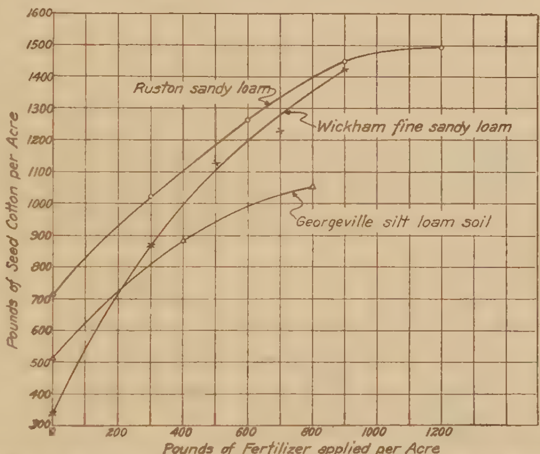

FIGURE 76.—Curves showing relation of seed-cotton yield to amounts of fertilizer applied

Fertilizers Save Labor

The fact that fertilizers increase unit land production would indicate that labor also is conserved by its use. This is found to be true if the labor required to produce certain crops is considered. In a survey of labor requirements it has been found that on an average 19 hours of labor are expended per acre for harvested corn, 11.7 hours for

TABLE 10.—*Increased labor efficiency from use of fertilizers as indicated by average yields obtained in long-time experiments on fertilized and unfertilized plots*

Crop	State	Yield per acre on—		Average hours of labor per acre	Yield per hour of labor on—		Increased labor efficiency
		Unfertilized plots	Fertilized plots		Unfertilized plots	Fertilized plots	
		Bushels	*Bushels*		*Bushels*	*Bushels*	*Per cent*
Wheat	Missouri	12.5	30	11.7	1.07	2.53	140
Do	Ohio	11.5	28	11.7	.98	2.39	143
Corn	do	27.2	46.6	19	1.43	2.45	71
Oats	do	31.9	51.2	13	2.45	3.94	61
		Pounds	*Pounds*		*Pounds*	*Pounds*	
Cotton	Mississippi	691	1,096	128	5.4	8.56	59
Do	South Carolina	1,321	1,816	128	10.3	14.2	38

wheat, 13 hours for oats, and 128 hours for cotton. In Table 10 are given results of long-time experiments of several State experiment stations on fertilized and unfertilized plots. The use of fertilizer indicates an increased labor efficiency of about 140 per cent for wheat, 71 per cent for corn, 60 per cent for oats, and 40 to 60 per cent for cotton on the assumption that the increased yields do not materially add to the hours of labor necessary. This is not strictly true as harvesting labor will be somewhat increased, but since preharvest labor, which is the largest part, is practically the same for a small or large yield, a distinct saving is made in the labor expenditure per acre.

Increased Profits from Fertilizer

The final criterion for the use of fertilizer is that it gives a profit. There are times when no profit will be realized even though fertilizers are employed. The absence of sufficient moisture for the crop, the uncontrolled ravages of insect pests, improperly selected crop or unsuitable soil or climate, and occasionally a very low price for a crop may so outbalance the benefits from fertilizer that its effect is diminished or lost. Under conditions suitable for normal growth, however, there is overwhelming evidence that the use of sufficient fertilizer will give a profit. As an illustration, in Table 11 are given data on cotton compiled from statistics gathered by the Department of Agriculture. The arrangement is by yield groups of pounds of lint cotton per acre.

TABLE 11.—*Cost per acre of producing cotton as related to cost of fertilizers*

Yield group (pounds of lint)	Average yield	Total cost	Net cost of lint per pound	Fertilizer cost	Total value of crop	Net profit
	Pounds	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
20 and under	14	21.09	1.45	2.94	5.02	−16.07
21 to 60	44	26.96	.55	4.25	15.42	−11.54
61 to 100	89	29.91	.30	3.97	30.15	+0.24
101 to 140	124	32.52	.22	3.39	41.61	9.09
141 to 180	161	34.30	.17	3.55	54.52	20.22
181 to 220	200	38.77	.16	4.48	67.93	29.16
221 to 260	245	42.33	.13	5.04	82.31	39.98
261 to 300	290	47.24	.12	6.27	98.77	51.53
301 to 340	324	58.29	.14	9.03	107.98	49.69
341 to 380	356	55.40	.12	8.75	119.76	64.36
381 to 420	401	59.35	.11	10.41	139.20	79.85
421 to 460	444	64.76	.11	9.99	145.16	80.40
461 to 500	495	67.01	.10	9.73	168.36	101.35
Over 500	618	83.00	.09	13.86	223.62	140.62

Similar data on corn, wheat, and potatoes show the same general characteristics. The lowest expenditure for fertilizer is in the lowest yield group and the highest expenditure in the highest yield group. The net profit per acre, shown in the last column, is closely related to the expenditure for fertilizer, or, in general, as the expenditure for fertilizer increased the net profit increased. The group with an average yield of 124 pounds is the lowest to show a profit, one of $9.09 per acre, with an expenditure of $3.39 for fertilizer. The highest yield group has the highest expenditure for fertilizer and shows the largest profit, a yield of 618 pounds, fertilizer expenditure of $13.86, and profit of $140.62. With the fertilizer expenditure increased about 4 times the profits are increased over 15 times.

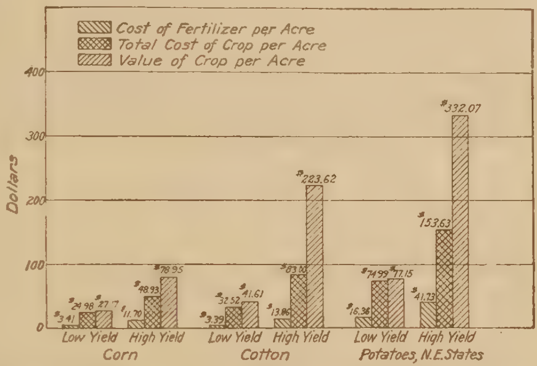

FIGURE 77.—Relation of cost of fertilizer per acre to total cost and value of crop in low and high yield groups

Heavy Fertilizer Applications Profitable

If the average price paid for fertilizer is used for converting the expenditure per acre to pounds of fertilizer applied, it is found that the applications ranged from 181 pounds per acre in the lowest group to 853 in the highest. This would indicate that the heavy applications are much more profitable. The chart in Figure 77 shows the relation of cost of fertilizer per acre to the total cost of the crop and the value of the crop. It indicates this for the lowest-yield group that showed a profit, and for the highest-yield group. Since the expenditure is in proportion to the quantity of fertilizer used the advantage of heavy applications is evident. This relation is also shown in Figure 78, where the net profit and pounds of fertilizer of Table 11 are plotted as coordinates.

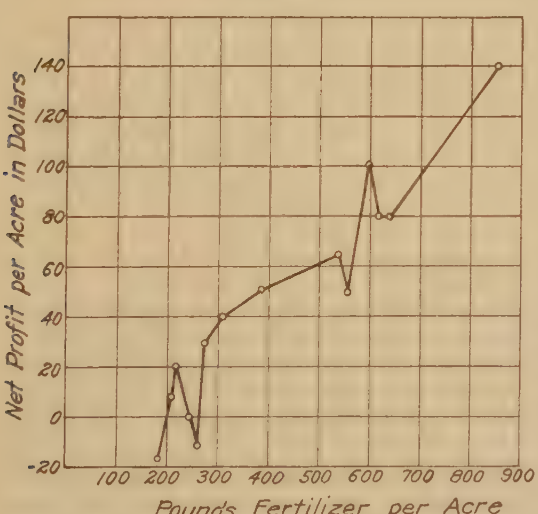

FIGURE 78.—Curve showing relation of net profit per acre to amount of fertilizer applied on cotton

In considering Table 11 and Figures 77 and 78, it must be remembered that these results are obtained from average figures of a number

of States during one season and so must be regarded as illustrative rather than as absolute values. Other seasons show corresponding but not identical relations, due to other factors entering into the net profits derived from a crop. Results obtained from many seasons on various crops show that fertilizers should be considered not as an added expense in the production of a crop but as a method of utilizing the soil more effectively, of reducing the costs of labor, and as an investment increasing the net profit per unit of crop and of land.

R. O. E. Davis,
Senior Chemist, Bureau of Chemistry and Soils.

FOOD and Drugs Imported Are Tested at Ports for Purity and True Labeling Many of the foods that come to our tables, and large quantities of the drugs that are in daily use to combat disease, reach our shores from foreign countries. All such imported products are subjected at our ports to rigid physical and chemical tests to determine their purity and the truthfulness of their labels. Those that are found to be adulterated or misbranded within the meaning of the Federal food and drugs act are immediately detained and ordered to be exported or destroyed, or, under some circumstances, are permitted to enter after rebranding or after otherwise being brought into compliance with the law.

The Food, Drug, and Insecticide Administration maintains chemical laboratories and corps of inspectors and chemists at all of the principal ports of entry of the United States to make the necessary tests of purity. The heads of these laboratories are given the authority, in cooperation with the customs officials, to exclude from the United States all products that are in violation of the food and drugs act. It is because of this inspection that the foods and drugs that come to our homes from foreign countries are pure and unadulterated. Although the interstate features of the enforcement of the food and drugs act will not be considered in this article, it should be remembered that domestically produced foods and drugs are under the same strict control as that applied to imported foods and drugs.

Port Inspection of Spices

Spices come to the United States from the four corners of the world, and port inspections invariably detect any lots of impure or adulterated spices when offered for entry. From June 1, 1928, to May 31, 1929, the Food, Drug, and Insecticide Administration's laboratories throughout the country detained at ports of entry about 5,000,000 pounds of spices. The chief faults found with the spices denied entry were excessive dirt and sand in anise, cumin, dill, fennel, mace, marjoram, and pepper; excessive stems in cloves; excessive moldy products in cassia, chilies, capsicum, ginger, and nutmegs; excessive wormy material in capsicums, coriander, ginger, mace, nutmegs, and turmeric; exhausted seeds in anise and cardamoms; and added foreign oil in ground paprika. Because of the exclusion of the impure spices, only lots that are sound, clean, wholesome, and pure reach American dealers and these give flavor and piquancy to the foods with which they are mixed. So well is it known the world over that the Department of

Agriculture's experts at American ports will not pass spice products unacceptable under American laws, that, when American orders are being filled by foreign merchants, the choicest products grown under the tropical sun are selected.

Cocoa beans, from which our chocolate, cocoa, and chocolate confections are made, come to us from Africa, the West Indies, and South America. Imports of cocoa beans run into the hundreds of millions of pounds each year, the volume being greater than that of any other food product imported, except coffee. In years gone by the methods of harvesting and preparing cocoa beans for shipment, in the countries where grown, were such as to cause a large percentage of the crop to deteriorate, by becoming wormy or moldy, or both. Efforts have been made continuously to pass on to the United States—the greatest consuming country for cocoa beans in the world—beans which, because of their wormy and moldy condition, were unfit for food. The experts of the Department of Agriculture examine all shipments of cocoa beans offered for entry and refuse admission to those that are unfit. In 1928 more than 225,000 bags, each weighing 140 pounds, were refused admittance into the United States, and in previous years even larger quantities were excluded. These continued exclusions have had a tendency to bring about improved conditions of growing, drying, fermenting, handling, and packing of cocoa beans in the producing countries. They have had, moreover, a very decided effect in causing cocoa beans to be carefully sorted before being offered for shipment to the United States, with the result that in 1929 it was necessary to detain and exclude from the United States only about 20,000 bags.

Rejection of Figs Unfit for Food

Figs come to us from Turkey, Algeria, Italy, and Greece. They are also grown in California. When sound and free from insect and worm infestation, figs are a delicious fruit. They are, however, subject to insect infestation because of the prevalence in the growing countries of the fig moth, which deposits its eggs in the fruit, the eggs later producing larvæ. The fig is also subject to mold contamination. Unless figs are properly handled and cared for, they ferment and become sour. The Federal inspectors whose duty it is to watch the frontiers to protect the food supply of the Nation look for worms, for mold, for fermentation, and for sourness in figs, and refuse entry to unfit shipments. Last year more than 11,500,000 pounds of figs were refused entry into this country. This amount represented 50 per cent of all such products shipped to the United States.

Dates sold in the United States come largely from Mesopotamia, although considerable quantities are also grown in California. Dates likewise are subject to infestation with worms and with a small beetle and sometimes become moldy. During the period December 1, 1927, to November 30, 1928, agents operating under the Federal food and drugs act excluded more than 1,250,000 pounds of dates that were found to be unfit for use.

Although most of the confectionery consumed in America is of American manufacture, a very large aggregate amount is shipped to the United States by European nations. Most of this confectionery complies with our high standards of purity, but in the period July 1, 1928, to June 30, 1929, the Food, Drug, and Insecticide Administration

found it necessary to refuse entry to some 15,000 pounds of confectionery that was artificially colored with unpermitted or poisonous dyes, contained centers alleged to be composed of fruit but in fact consisted of artificially flavored imitations of fruit, contained alcohol, or was adulterated or misbranded in some other way.

Imports of Canned Products

Italy, France, Belgium, and Holland prepare large quantities of canned vegetables for the American market. Norway, Spain, Italy, and France send us large amounts of canned fish. England supplies us with many preserves. Shipments of such products must pass inspection before entering the commerce of the United States, and products unfit, unwholesome, impure, or falsely labeled, although often seeking entrance, do not succeed in passing the inspections and chemical tests applied to determine their suitability for consumption by American consumers. During the last year of which there is record more than 5,000 cases of canned fish and nearly 7,000 cases of canned vegetables were denied entrance at American ports.

Olive oil is uniformly inspected for purity and all shipments in any way adulterated or misbranded are excluded. Dishonest foreign shippers, who would flood this country with adulterated and spurious olive oil if they could, have learned by experience that it is unprofitable to attempt to practice fraud on the American people. When they try, their shipments are returned to them by compulsion, a costly experience, because of freight and handling charges. Consequently they seldom now send spurious products to the United States. During the last year the experts of the department found it necessary to exclude only a few thousand cases of edible oils of all kinds, representing less than 1 per cent of the total quantity shipped to the United States.

Medicines labeled with curative claims for all of the diseases to which the human family is heir come to our shores from foreign countries and knock for admittance, but find the doors securely locked whenever exhaustive tests show them not to contain drugs or drug combinations capable of producing the curative effects claimed. Over 3,000 lots of fraudulently misbranded medicinal preparations were denied entry during the last year.

Similarly, the food and drugs act sets a high standard for crude drugs. Over 8,000,000 pounds, representing a wide variety of crude drugs, were denied entry last year because they were adulterated. In addition, more than 1,500,000 gallons of cod-liver oil were detained because the product did not meet the test laid down in the Pharmacopœia, which is the official standard under the food and drugs act for all drugs named in it.

Pharmaceutical products, drug tablets, fluid extracts of drugs, and miscellaneous pharmaceuticals must invariably be pure, unadulterated, and in conformity with the strength declared on their labels, if they are to enter the United States for sale.

Wide Variety of Products Excluded

Among the numerous adulterated and misbranded foods and drugs excluded from entry into the United States under the food and drugs act during the last year reported were the following:

Beverages, including beverage sirups and materials, 10,000 cases; flour and meal, 200 bags; bread and cake, approximately 1,000 cases; alimentary pastes,

more than 1,000 cases; miscellaneous cereal products, about 100 cases; cocoa beans, about 20,000 bags; chocolate products, over 2,500 cases; coffee, about 3,000 bags; cheese, approximately 3,500 cases; dried milk, over 600 cases; cod-liver oil, 1,500,000 gallons; patent medicines, over 3,000 lots; crude drugs, over 8,000,000 pounds; frozen egg, over 1,000 cases; dried egg, approximately 300 cases; canned and other fish, more than 5,000 cases; canned and preserved fruits, over 1,500 packages; figs, 11,500,000 pounds; dates, 1,250,000 pounds; miscellaneous dried fruits, over 15,000 packages; jellies and jams, about 200 cases; olives, approximately 2,500 barrels; grains and stock feeds, about 1,000 bags; gelatin and meat products, in round figures, 6,700 packages; nuts, approximately 3,000,000 pounds; oils, in the neighborhood of 5,000 cases; confectionery, approximately 1,500 cases; sirups and other saccharin products, about 100 cases; canned shellfish, in the neighborhood of 1,500 cases; spices, approximately 5,000,000 pounds; canned vegetables, about 7,000 cases; dried vegetables, over 60,000 bags; vinegar, more than 100 cases; and table and mineral water, more than 3,000 cases.

The quantities listed really represent only a small percentage of the total coming to the United States. Roughly speaking, more than 95 per cent of the products offered for entry meet the requirements of the food and drugs act and are admitted. On the average, less than 5 per cent now fail to meet the terms of the law.

The effect of the application of import control under the food and drugs act to foods and drugs can not be measured in terms of actions taken or quantities detained and refused admittance. It should be remembered that the food and drugs act has been enforced for a long period and this enforcement has caused an improvement in the quality of products intended for American shipment, which improvement, as well as the permanent correction of the old forms of adulteration, has been made in the producing countries. Foreign merchants dealing with America know and appreciate in general what the requirements of the food and drugs act are. Their knowledge that this law is strictly enforced is an effective deterrent in preventing the shipment of inferior products to the United States.

Foreign Attitude on United States Law

Just what is the attitude of foreigners regarding our program and our activities in the interest of insuring a pure and unadulterated and honestly branded food and drug supply? Here are a few expressions quoted to give a cross-world view of the opinions of our method and actions in enforcing the food and drugs act.

Recently an exporter of figs from Turkey visiting the United States said to one of our experts:

> The best qualities of figs are selected for United States delivery. We must send you the best of our crops, because you will not accept our poorer qualities. We have no trouble anywhere else in the world in selling the figs we produce.

A representative of a salvage association from London remarked, "Damaged lots of merchandise have a ready sale, but not in the United States." A cod-liver oil manufacturer from Norway tells us, "Your tests are uniformly correct. We do not dare ship anything but pure cod-liver oil to the United States." A Rotterdam merchant lately stated, "We take no chances in the American market with off-grade goods, for we know that they will not pass the barriers your food and drugs act has set up." A date packer from Bassorah, while on a visit to New York, told us, "America is our best market—for high-quality dates." A cocoa merchant from West Africa freely admitted, "Our lowest grades go to Europe; our best, to America." An exporter of pepper from Indo-China confessed, "We have no trouble with Government inspection anywhere in the world except in the United States.

There we find the operation of the food and drugs act continuously demanding clean and sound products."

According to a representative of the Bureau of Foreign and Domestic Commerce, United States Department of Commerce, who has traveled all over the world:

> Two, and only two, United States laws are well known in foreign countries. One of these is the food and drugs act. Foreign peoples of every nation in the world have a profound admiration and respect for the methods employed and effects produced in the enforcement of the food and drugs act. The world knowledge of the efficiency of its enforcement causes foreign shippers to go straight in their American business, for fear of the consequences, and this same knowledge causes foreign consumers to have an implicit faith in foods and drugs of American manufacture.

To meet American requirements with respect to purity and proper branding of foods and drugs intended for American shipment, many governments have issued decrees and passed laws intended to prevent the adulteration or debasement of food and drug products intended for United States delivery, thus obviating the exclusions which are known to be sure to follow the offering of impure products for import into this country. Trade associations the world over are distributing copies of United States standards for foods and drugs, and American importers are buying under contracts containing guarantees that goods bought must meet such standards and must be guaranteed to pass Department of Agriculture port inspection. Scientific and commercial advisers are working throughout the world to eliminate forms of contamination, deterioration, and spoilage, which bar products from entry into the United States. Individual farmers, laborers, and workers of all kinds, the world over, are being taught the necessity for care in production, for discrimination in selection, for sanitation in handling, and for honesty of branding, because of the effect of the enforcement of pure food and drug laws in the interest of the consuming public in the United States. Buyers are learning the science of sampling and examining products to predetermine whether they will pass American inspection, and methods of sorting, cleaning, segregating, and selection are being introduced at all the centralizing points of the world from which foods and drugs are shipped, in order to yield products that will conform to our standards and pass our inspection.

W. R. M. Wharton,
Chief, Eastern District,
Food, Drug, and Insecticide Administration.

FORAGE-CROP Seed Imports Vary Much from Year to Year; Sources World-Wide With the exception of timothy, the United States does not produce enough seed of the principal forage crops to meet the seeding requirements of the country. Depending on the size of the domestic crop, the carry-over from the previous year, and the size of the foreign crop, the quantity of each kind of seed imported varies greatly from year to year. Sixteen times as much alfalfa seed was imported in 1924 as in 1928; fifty-five times as much red-clover seed was imported in 1924 as in 1923; and more than twelve times as much orchard-grass seed was imported in 1929 as in 1928. On account of this wide difference in annual imports, any estimate of the important needs of the country can only be based on the total imports of a series of years.

In Table 12 are given the total imports for the 10-year period ended June 30, 1929, of the seeds subject to the Federal seed act. The quantities given in this table do not correspond with the previously published figures, as they have been adjusted to indicate as far as possible the country in which the seed was grown instead of the country from which it was shipped to the United States. In the main, the countries from which imports are drawn are determined by surplus production and price, as the importing country normally seeks its supplies in the lowest-priced world market.

TABLE 12.—*Forage-plant seeds permitted entry into the United States under the Federal seed act during the 10 years from July 1, 1919, to June 30, 1929*

[Quantities shown in hundredweights]

Country	Alfalfa	Canada bluegrass	Alsike clover	Crimson clover	Red clover	White clover	Orchard grass
Argentina	258, 641				168	66	
Canada	128, 701	90, 317	707, 771	335	18, 175	122	123
Chile	2, 675				27, 031		
Czechoslovakia			438	6, 868	10, 345	7, 627	
Denmark			720	215	2, 318	3, 051	96, 317
England			236	14, 591	63, 922	11, 302	2
France	56, 507			349, 895	835, 219	537	
Germany	5, 145		4, 103	53, 262	41, 240	56, 484	10, 347
Hungary	1, 107			33, 665	8, 294	681	
Ireland					223	375	
Italy	109, 205			2, 079	112, 681	8	
Japan						60	
Latvia							
Netherlands	1, 497			246	4, 456	2, 108	591
New Zealand	300				304	2, 977	
Poland			720	629	42, 054	35, 528	
Russia, Asiatic	51, 411						
Russia, European					23, 691		
Scotland	1, 208		331		2, 124	1, 679	1, 116
South Africa	25, 078					22	
Sweden							2, 356
Others	[1] 8, 799			[2] 6, 157	[3] 12, 152	[4] 480	332
Total	650, 274	90, 317	714, 319	467, 942	1, 204, 397	123, 107	111, 184

Country	Rape	English ryegrass	Italian ryegrass	Hairy vetch	Spring vetch	All other forage crops	Total
Argentina			5, 810				264, 685
Canada	450	975	190	3, 015	3, 375	32, 613	986, 162
Chile							29, 706
Czechoslovakia				26, 796	217	273	52, 564
Denmark		1, 765	12, 250	5, 386	176	166	122, 364
England	3, 403	6, 448	949	682	6, 489	128	108, 152
France	30, 158	4	14, 036		1, 234		1, 287, 590
Germany	14, 054	174		126, 272	36, 648	469	348, 198
Hungary	7, 193			29, 893		764	81, 597
Ireland		111, 763	35, 862				148, 223
Italy							223, 973
Japan	229, 568						229, 628
Latvia				40, 367	14, 517		54, 884
Netherlands	290, 025	52	507	1, 015	23, 836	236	324, 569
New Zealand	1	24, 373	8, 641			280	36, 876
Poland	7, 104			5, 783	4, 697	220	96, 735
Russia, Asiatic							51, 411
Russia, European							23, 691
Scotland	142	16, 467	5, 566	274	1, 972	2	30, 881
South Africa							25, 100
Sweden				12, 752	110		15, 218
Others	[5] 6, 260	[6] 344	4	[7] 2, 753	[8] 1, 003	[9] 891	39, 175
Total	588, 358	162, 365	83, 815	254, 988	94, 274	36, 042	4, 581, 382

[1] Spain, 4,375; American goods returned, 876; Uruguay, 1,645; Luxemburg, 110; Peru, 4; Belgium, 1.
[2] Austria, 3,987; Belgium, 324.
[3] Rumania, 1,553; American goods returned, 893; Austria, 275; Luxemburg, 314.
[4] Austria, 135.
[5] China, 4,551; Austria, 774.
[6] Australia, 19.
[7] Lithuania, 1,102; Austria, 206.
[8] Austria, 333; Estonia, 331.
[9] China, 652.

Comparative field tests carried on for many years have shown marked differences in adaptability to conditions in the United States of seed grown in different parts of the world. As the difference in agronomic value between domestic and foreign grown alfalfa and red-clover seed became recognized, domestic seed commanded a higher price, often 50 per cent above that of imported seed.

Coloring to Prevent Substitution

In order to prevent the substitution of imported seed for domestic seed, the Federal seed act was amended to require the coloring of all imported seed of alfalfa and red clover. This coloring enables the consumer to know whether he is buying imported or domestic seed. The proportion of the seed colored and the color used indicates the general agronomic value of the seed for use in the United States. Ten per cent red coloring (orange red in the case of Argentine alfalfa seed) indicates general unadaptability, all other alfalfa and red-clover seed being colored 1 per cent green with the exception of Canadian seed, which is colored 1 per cent violet. The 10 per cent coloring provision, affecting seed of alfalfa and red clover grown in certain countries of mild climate, has brought about a reduction of imports from those countries quite independently of natural supply and demand.

Supplies of all of those seeds subject to the Federal seed act have been drawn during the last 10 years from practically all of the producing countries of Europe as well as from Russian Turkestan, Japan, South Africa, and South America.

The principal sources of alfalfa have at various times been Argentina, Canada, Italy, France, and Russian Turkestan. During 1926 and 1927 Canada was the principal source of supply, and in 1929 Argentina and Russian Turkestan. The chief source of red-clover seed has been France, with smaller proportions from Italy, England, Germany, Poland, Russia, Chile, Canada, and Czechoslovakia, the imports from Poland and Russia having increased markedly the last two years. Canada has been the chief source of alsike clover and has furnished all of the Canada bluegrass seed imported into the United States. Crimson-clover seed has come mostly from France, with Germany, Hungary, England, and Czechoslovakia furnishing smaller quantities. Germany, Poland, England, and Czechoslovakia have been the largest exporters to the United States of white-clover seed. Orchard grass has come from Denmark and Germany; rape from Holland, Japan, France, and Germany. Perennial ryegrass seed has come from Ireland, New Zealand, Scotland, and England, and Italian ryegrass seed from Ireland, Denmark, New Zealand, France, and Scotland. Approximately one-half of the hairy-vetch seed was shipped from Germany, although doubtless some of this was grown in other countries. Next to Germany, Latvia, Czechoslovakia, Hungary, and Sweden were the largest shippers of this seed to the United States. Spring vetch came mostly from Germany, Holland, Latvia, and England. Foxtail millet was the largest other item, 1,637,200 pounds being imported, mostly from Canada.

Seeds Not Subject to the Act

Of the forage-plant seeds not subject to the Federal seed act, two items are imported in sufficient quantities to be of particular impor-

tance. During the last eight years approximately 30,000,000 pounds of sweetclover seed were imported, mostly from Canada, and 12,500,000 pounds of fescue seed, mostly from New Zealand and Germany. In the case of those seeds not subject to the Federal seed act, there is no restriction as to the quality that may be imported.

E. Brown,
Principal Botanist, Bureau of Plant Industry.

FOREIGN Trade in Farm Products Is Above Pre-War Level The world trade in agricultural products continues on a high level. As the population of the world continues to increase, the large commercial and industrial centers continue to grow and increase the demand for agricultural products from distant areas where conditions are favorable for agricultural production. The division of labor or specialization in agricultural production among the different nations continues to increase. In spite of the many attempts on the part of several European countries following the World War to increase their self-sufficiency, they have not succeeded except in a few special instances and are importing more than ever before. Commercial and industrial centers are developing in the Orient, particularly in Japan and China, and thereby increasing the international trade in agricultural products.

Both the agricultural exports and imports of the United States are being maintained on a considerably higher level than before the war. The tendency in the United States is to increase exports of a few commodities, such as apples, raisins, citrus fruits, and tobacco, and to maintain on a high level the exports of wheat and cotton, whereas the exports of some of the grains and meats are declining. On the other hand, agricultural imports into the United States are increasing. There is a tendency to increase imports of winter vegetables, vegetable oil-bearing seeds, sugar, cocoa, silk, and especially rubber.

Europe an Expanding Market for United States Fruit

The rapid increase in exports of fruit is an outstanding feature of United States trade. An examination of our export statistics shows that the value of fruit exported from the United States during 1928–29 exceeded that of tobacco; was not much less than the total value of bacon, hams, and lard; and amounted to about 45 per cent of the grain and 16 per cent of the value of cotton. All kinds of fruit shared in the advance, with fresh fruit showing the heaviest gains. With increased purchasing power and higher standards of living, Europe is the most promising outlet for fresh, dried, and canned fruit. The United Kingdom consumes at least half of the fresh apples, one-third of the raisins, and about three-fourths of the canned fruit that are exported from the United States. Germany is our best outlet for dried apples, apricots, and prunes; over 80 per cent of our orange exports and a fourth of our raisins go to Canada.

Exports of Meats and Meat Products Decline

With hog production in Europe practically restored to a pre-war basis and production in Argentina and Canada on the increase, United States exports of bacon and hams have resumed the decline

which set in at the opening of the century and which was only temporarily interrupted by the abnormal demands of the World War. Lard is an outstanding exception to the downward trend in exports noted in the case of other meats and meat products. Because of the lack of competition from other sources the United States has been able to maintain its position as an exporter of lard. The competition of vegetable oils and fats from the tropical and subtropical countries, however, is increasing.

The Orient Takes More Cotton, Tobacco, and Wheat

Better control of the boll weevil, expansion in acreage, and improved harvesting methods, have resulted in more and cheaper cotton so that United States exports have regained their pre-war position and are considerably above the exports of the early post-war years. The striking development of the textile industry in Japan and to some extent in China and the growth of cotton manufactures in Canada have strengthened the demand from these sources and, supplemented by an increasing home consumption, have lessened our dependence on European markets. Before the war at least 95 per cent of our surplus cotton went to the United Kingdom and continental countries; to-day only about 80 per cent is consigned to those markets whereas Japan, which in earlier years purchased less than 3 per cent of our total exports, now takes about 14 per cent. Annual exports to that country since 1925 have averaged 1,286,000 bales.

About 45 per cent of all the tobacco that finds its way into the channels of foreign trade comes from the United States with recent years showing a decided upward trend. The increase in the volume of United States exports, consisting largely of bright flue-cured tobacco, has been absorbed almost entirely by countries outside of Europe, more especially by China. With a growing taste for the cigarette it seems that China may continue to import cigarette tobacco heavily from this country.

The Orient is also becoming an important factor in the wheat trade of the world. Japan is not only increasing wheat flour consumption but does an important milling business for other ports of the Orient. China is importing increasing quantities of wheat and flour. In the past season these two countries took large quantities of cheap low-grade wheat from Canada in addition to considerable quantities of wheat and flour from the United States and Australia.

Russia Still Negligible in Agricultural Export Trade

Russia, once the world's largest exporter of cereals, is still virtually absent from the export market and there is little indication of an early recovery of its former position. Along with the breakdown of Russia's economic structure, the development of the newer agricultural areas in other countries has gone forward at a rapid pace and European deficit countries which formerly drew largely from Russian supplies are now importing heavily from Canada, Argentina, and Australia. Canada now exports more than three times as much wheat as it did before the World War and twice as much as Russia then exported. The strength of our foreign competitors in the European market since the war has had an unfavorable effect on our exports of

wheat which, though continuing much above the pre-war level, have declined in recent years, but this decline has been offset in part by an increase in exports of barley which in 1928–29 reached the record figure of 48,000,000 bushels.

Russia's exports of butter are still far below the pre-war level and its former position has passed to New Zealand which now ranks next to Denmark as the largest exporter of this commodity. The United Kingdom now imports nearly four times as much butter from New Zealand as it did before the war and almost twice as much as it formerly imported from Russia.

The United States Imports of Agricultural Products

Principal imported agricultural products competing directly with United States products are sugar, wool, flaxseed, and subtropical fruits and nuts. Only about 20 per cent of our total consumption of sugar is produced in continental United States. About 20 per cent comes in duty free from Porto Rico, Hawaii, and the Philippine Islands, and practically all of the remaining 60 per cent is imported from Cuba. The proportion of our total sugar consumption supplied by Cuba and our insular possessions is increasing. Imports of wool constitute about 50 per cent of our total consumption. A considerable part of the imports, however, consists of carpet wool, which does not compete directly with our domestic wool. In recent years there has been a definite tendency toward increased wool production in the United States and a corresponding downward trend in importation of wool.

Imported flaxseed, largely from Argentina, provides over 40 per cent of our domestic consumption of this product. Flaxseed imports are on a considerably higher level than before the war, while domestic production is on the average only slightly larger. Imports of such subtropical products as lemons, dried figs, raisins, and walnuts are in general declining as a result of increasing production in the United States. They still represent, however, a considerable part of our total consumption of these products. An outstanding development in our import trade in agricultural products has been the increased importation in recent years of vegetable oils and oil materials. Although these products, such as copra, coconut oil, and palm oil, are not produced in the United States, they compete in use with American dairy products, cottonseed oil, and other domestically produced vegetable oils.

About half the agricultural products imported do not compete directly with the products of the farms of the United States. The most important of these products are rubber, coffee, tea, and silk. Most of the silk comes from the Orient, and imports have doubled in the past 10 years. Coffee and cocoa imports have been maintained, whereas the imports of tea have declined in this period. The greatest increase in trade has taken place in rubber. The great development of the automobile industry in the United States has brought a large proportion of the rubber trade to the United States and imports have more than doubled in the past 10 years.

O. C. STINE,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

FOREST-FIRE Fighters Use Big Machines in Cutting Control Roads The fire demon, which takes a toll of more than a million dollars a year from California's fields and forests, now faces a defensive army equipped with new and powerful fire-prevention and suppression weapons. These weapons are 60-horse power tractors, 5-ton blade graders, and heavy V-type drags used in the construction of fire lines and motor ways (rough and narrow fire-control roads) in the 18 national forests of the State.

The Forest Service, from years of experience in the ways of conflagrations, has long known that an important factor in the prevention as well as the control of large fires is a network of motor ways and fire lines. These permit fire fighters to reach the fire in the shortest possible time and place it under control before it has a chance to become a big fire. The saving in fire-fighting expenditures alone, not to mention the saving of valuable forest resources, is often equal to the cost of the motor ways or fire lines. General adoption of this system of fire protection by Federal foresters has been prevented in the past by the high cost of man power for building fire lines and motor ways by hand through the dense brush that clothes many foothill and mountain areas. A veritable army of men were formerly required to do this gruelling construction work, and the cost of manual labor frequently exceeded $500 a mile. In some mountain regions, with extremely rough terrain and a dense brush-forest growth, 175 sweating, toiling men were able to build only 1 mile of cleared fire line a day. When dependence was placed upon muscle, and mattock, brush hook, and shovel in the face of an on-rushing fire, the work was often disastrously slow.

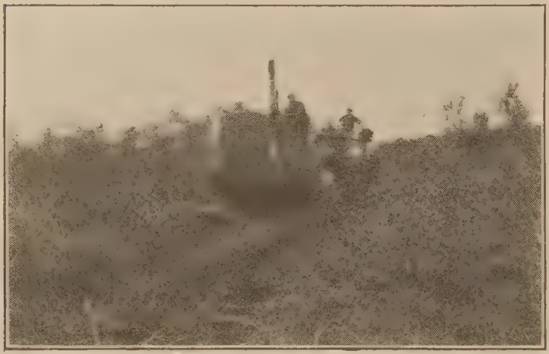

FIGURE 79.—Fire-line construction with machinery

The adoption of machinery in the place of hand labor bids fair to revolutionize fire-line construction. Powerful tractors, pulling heavy V-drags or graders, plunge with brute force through the dense brush, leaving in their wake a broad, open fire line, often constructed at the rate of a mile an hour. Experiments conducted by the Forest Service in the national forests of California during the past two years have resulted in the construction of 160 miles of motor ways on the Shasta, California, Tahoe, Stanislaus, Sierra, Santa Barbara, and Cleveland National Forests, and 110 miles of fire lines in the Angeles and Cleveland National Forests. The average cost of the motor ways was $125 per mile, and of fire lines from 30 to 50 feet wide $50 per mile, as against a former cost by hand labor for fire-line construction in the same regions of approximately $400 per mile. The Forest Service had 32 tractors and graders operating in 1929 in the national forests of California, and is planning to extend the construction of fire lines and motor ways by machinery as rapidly as funds are made available.

WALLACE HUTCHINSON,
Assistant District Forester, Forest Service.

FOREST-GROWN Evergreens Can be Transplanted if Proper Care Is Taken

Who has not dug up a young pine, fir, or spruce in the woods, planted it in his yard, cared for it and watched over it hopefully, only to see it slowly fade and finally wither? A tree can not live if, for any great length of time, more water is lost through the leaves and stems than is absorbed by the roots. In a normally developed tree the roots have a greater spread than the branches. When a tree is dug up the roots are usually cut off at a convenient distance from the main stem, and thus the water absorbing capacity is reduced 50 to 90 per cent. In broad-leaved trees this handicap can be offset in part by transplanting before the leaves appear in the spring, and in part by cutting back the branches. Evergreens, on the other hand, must be transplanted when in full foliage, and it is not considered good practice to prune the branches. The roots of evergreens are also more sensitive to drying than are those of deciduous trees.

The chief endeavor in transplanting evergreens should be to reduce to the lowest possible point the unfavorable balance between water loss and water absorption.

The first rule is to transplant when the tree is in a more or less dormant state. Early spring is usually the best time, although some nurserymen prefer fall or late summer. The best season in a given locality depends upon the climate and must be determined by local experience.

The second rule is to get as much root as possible. Since there are obvious limitations to the length and depth of roots that can be removed, it is always safest to select rather small trees. A tree 3 or 4 feet tall and fairly well supplied with roots is going to be larger at the end of five years than a taller tree which is too severely handicapped by loss of roots.

Keeping the Roots in Good Condition

The third rule is to keep the roots in the best possible condition, so that they can begin functioning immediately in their new environment. Do not expose them to dry air for more than a few seconds. Wet burlap and moss provide an effective cover. Unnecessary bruising or barking of roots should be avoided.

Even with the greatest precautions the roots receive a setback when torn loose from the soil particles. For this reason the best practice is to remove the tree with a ball of earth attached to the roots, digging carefully around and under the tree, then covering the ball with burlap and binding securely with a network of strong cords. A tree 4 feet tall should have a ball at least 2 feet wide and from 1 to 2 feet deep. Larger trees require larger balls. Theoretically it is possible to transplant a tree of any size if the ball of earth is sufficiently large. But the person who wants only a few trees at nominal cost will obtain best results by selecting specimens not over 4 feet tall.

Many trees properly dug are killed by careless handling in transportation and storage prior to planting. If the roots are not balled, they should be packed in moist moss or other moisture-retaining material. If they are balled, the ball should be watered if necessary and protected against sun and wind until safe in the ground. The tops should also be covered in order to reduce transpiration to a minimum.

Moisture Requirements After Transplanting

After the tree is planted the soil should be kept moist but not too wet. A good practice is to set the tree so that the upper surface of the ball is half an inch below the general ground level, and when watering apply enough to wet the entire ball. It may be advisable to provide shade the first season. Spruce and firs thrive in partial shade and may be planted permanently on the north side of a building or fence.

One who contemplates removing trees or other plants from a national forest should first consult the supervisor or ranger. In removing trees from any land have a thought for the beauty and well-being of the forest. As a rule trees should not be dug along public highways. In no case should the holes be left open or neighboring trees damaged. It is usually possible to select trees for removal in spots where neighboring trees will quickly occupy the space left vacant. Thus neither the productiveness nor the appearance of the forest need be impaired.

G. A. Pearson,
Director, Southwestern Forest Experiment Station, Forest Service.

FOREST-LAND Exchange Policy Is to Protect Timber and Watersheds The Rocky Mountain national forest district embraces the national forests in South Dakota, Nebraska, Oklahoma, and Colorado, and all but two of those in Wyoming. These forests, like all those in the Western States, were carved out of the public domain. They were created primarily for the production of timber and the protection of watersheds. The boundaries were laid out, however, with due consideration for the then prevailing conditions of use and settlement in the immediate vicinity. The forests were largely restricted to wild, rugged mountainous areas, and the boundary lines kept far above the lower limits of timber growth. Very large areas of land ideally suited for timber production were never included. In recent years, the Forest Service has been under constant pressure to make additions from these lands. Actual addition to the forests can be accomplished only by presidential proclamation or by act of Congress. The latter is the only possible procedure in certain States, including Colorado and Wyoming.

In conducting the work of land exchange, the Forest Service establishes, first, the ultimate, or theoretically ideal boundary for each national forest. This boundary is drawn so as to include, as far as is practicable, only those lands which will yield their greatest return when handled permanently under systematic management for growing timber and protecting watersheds. Grazing and agricultural lands are not included, except incidentally where it is impracticable to exclude them without making an illogical boundary.

Examination of lands within these ultimate boundaries has been going on for many years. Some areas have already been included on the forests. Areas aggregating 1,671,846 acres have been examined, and approximately 750,000 acres are in the process of examination. Whether all or any part of these lands become national-forest lands will depend entirely upon the ability of the interested local people to secure the needed legislation or presidential action.

Of late years there has been a growing demand from stockmen for the addition of public-domain grazing lands to the forests. The reason, of course, is the desire to secure protected and stabilized grazing privileges. The inclusion of grazing lands as such involves a wholly different basis of valuation and would necessitate a specific broadening of the primary purposes for which the forests were created. This, if it is ever done, can only be in response to a widespread demand from the people expressed in the form of definitely permissive legislation.

Much Land of No Farm Value Taken Up

At the time the forests were created, much of the accessible arable lands within the boundaries had already passed to patent under the various homestead laws. The forest homestead act of June 11, 1906, resulted in the patenting of an additional acreage of presumably agricultural land. In addition, many areas have been patented under the mining laws. During the last 20 years, however, actual experience has shown that a great deal of the land taken up for farming has no agricultural value. Much of this land has been logged over and used for grazing, but is deteriorating and is no longer yielding sufficient returns to pay taxes. The same is true of great numbers of worked-out mining claims whose incidental timber and forage resources have also been skimmed off.

A very large proportion of these lands have decided values for either timber production or watershed protection, or both, and are capable of yielding satisfactory returns if consolidated with adjoining national-forest lands and placed under management. Under the authority of the general exchange act, the Forest Service is engaged in acquiring such lands as rapidly as practicable. The law permits the exchange of Government-owned land or Government-owned timber for the private lands, but stipulates that each exchange made must clearly be to the public interest.

A carefully prepared exchange plan is now in effect on each forest. All the privately owned lands on the forest are mapped and recorded, with data describing each individual tract. Two general groups are established, one of lands not desirable of acquisition, such as agricultural lands, active mining properties, and recreational areas owned by resorts, hotels, etc., and one of lands desirable for forestry purposes.

Whenever land is offered for exchange forest officers appraise the land carefully, determine its true worth to the Government, and complete the transaction only if the consideration demanded by the owner falls within the limit established by the appraiser. In all cases, the actual prices realized in the open market for comparable lands are carefully considered. Under no circumstances is this market value exceeded, and, in fact, the majority of exchanges are consummated on the basis of materially lower prices.

In the land for land trades, the Government land disposed of is usually in isolated tracts or is land possessing grazing rather than timber values. As a general rule, good timber land is not traded away, the only exceptions being when the Government acquires better land or an increased acreage of similar land. The Government has traded away 28,384 acres of national-forest land and has secured 31,848 acres of land and 21,184,000 board feet of standing timber in return. Additional cases pending involve the acquisition of 13,441 acres and 9,387,000 board feet of timber for 11,868 acres of Government land.

Land Obtained at No Cost

Under the land for timber form of trade, the Government has acquired 33,218 acres of private land with 57,257,000 board feet of timber in return for 42,859,000 board feet of Government timber. This Government-owned timber was valued at $114,945.96. The cost to the Government of the land acquired was $3.16 per acre but the 57,000,000 feet of timber acquired is considered to be worth more than the 43,000,000 feet traded away; so actually the land was secured at no cost. Additional cases are pending which will give the Government 8,065 acres of land and 42,732,000 board feet of timber in exchange for 13,868,000 feet of timber valued at $41,062.03. In spite of these apparently bargain prices no injustice is being done individual owners. Often the owner is carrying a heavy burden in taxes and being unable to market his timber to advantage considers such a trade good business.

The policy of the Forest Service is not to acquire standing timber except incidentally, but to devote most of its energies to acquiring cutover and burned lands which can be secured very cheaply and which, under proper management, can be restored to productivity and become a valuable addition to the public forests.

JOHN W. SPENCER,
Administrative Assistant, Forest Service.

FOREST Planting an Economic Need in Northern Lakes Area

Forest planting is now becoming generally recognized as one of the outstanding economic necessities for the rehabilitation of the northern Lake States region. This vast forest region lies roughly in the upper or northern halves of the States of Michigan, Wisconsin, and Minnesota.

There are approximately 57,000,000 acres of absolute forest land in the Lake States. Only about 14 per cent of this area carries appreciable stands of merchantable timber. The total lumber production from the three States in 1927, the last year for which statistics are available, was 1,794,000,000 board feet and the lumber consumption was 3,526,000,000 board feet, a net deficit of 1,732,000,000 board feet shipped in from without the region. In other words, one of the potentially greatest forest-producing regions of the United States is now consuming annually practically double its lumber cut.

What Planting Can Do

It is estimated that 33,000,000 acres in the region are denuded or bear no forest growth of appreciable value. If planted to young trees this area, now a burden to the owners and largely reverted or in process of reversion to the counties and States for nonpayment of taxes, would produce, at the average rate of growth for plantations, stands of 200 board feet per acre per year, an annual total of 6,600,000,000 board feet. What an economic relief this would be to the States and counties involved.

Planting in the Lake States is far beyond the experimental stage. Technic is well developed. Under competent technical supervision thrifty growing plantations are certain. Up to and including 1928,

successful plantations had been established on about 100,000 acres. Of this about 56,000 acres were planted by the States, 32,000 acres by the Federal Government, and possibly 12,000 acres by private owners. The State of Michigan has been particularly active and alone has planted approximately 49,000 acres. For all agencies the area planted yearly in the Lake States has now risen to over 25,000 acres. Even at this greatly increased rate, however, 1,320 years would be required to complete the present area in need of reforestation.

Planting Costs and Returns

Forest planting in the Lake States is relatively cheap. The sandy pine lands which constitute a large percentage of the denuded acreage can be satisfactorily stocked for as low as $3 per acre. Considering all types of lands, however, an average figure of $5 per acre on efficient large-scale projects is more conservative. The Lake States Forest Experiment Station estimates representative yields at merchantable size and age for plantations on medium sites as shown in Table 13.

TABLE 13.—*Yields of jack, Norway, and white pines and of white spruce on medium sites*

Species	Age (years)	Yield
Jack pine	40	30 cords pulp-wood.
White spruce	60	30 cords pulp-wood.
Norway pine	60	15,000 feet board measure.
White pine	60	15,000 feet board measure.

The financial return, of course, depends upon a number of variable factors and must be determined separately for each plantation project, but under conditions obtaining over large portions of the region a net money return of 4 to 6 per cent on the capital investment is indicated. This does not take into account the more important returns to the communities and States or renewed raw materials and rehabilitated industries.

Public sentiment is becoming insistent upon an adequate program for the large public holdings of deforested lands. This sentiment is particularly well crystalized in Michigan where, after long years of sporadic effort, an annual program in excess of 8,000 acres on State forest lands is now under way. It is evidenced by the action of the Kiwanis clubs of the State which, in 1928 and 1929, have contributed a total of approximately $20,000 to finance the establishment of a 10,000-acre plantation of Norway pine on the Huron National Forest, the Government contributing the trees and the technical supervision of the work. Meanwhile, pulp and paper, water power, and other private agencies are translating increased interest into larger acreages planted. Wisconsin and Michigan distribute annually millions of tree seedlings from State-owned nurseries at slightly more than cost of production for planting within their borders.

Federal Share of the Planting Burden

Under the present program the Government owns or has in process of acquisition in the Lake States, national-forest lands which include

1,214,000 acres in need of planting. This is 3.8 per cent of the regional total. The present program provides for planting on these lands about 10,000 acres a year, at which rate the job would be completed in 121 years. In order to fulfill the avowed purpose of these Lake States national-forest units as model forestry demonstration areas, the planting work should be speeded up to completion within a 30-year period, or a yearly program of 40,000 acres. The ultimate effect of such a program lies not merely in bringing into production about a quarter of a billion board feet of wood products annually from the Government property now idle, but in stimulating State, county, municipal, and private reforestation on the remaining thirty odd million acres of idle forest lands in this vast region which is now suffering acutely from the shortage of wood material and the dwindling of the wood-using industries.

W. F. Ramsdell,
Assistant District Forester, Forest Service.

FORESTATION Averts Erosion on Abandoned Mountain Farm Land When steep cultivated land is abandoned before its surface has been bound by vegetation, the soil that has accumulated through centuries of rock disintegration may be entirely removed by a few years' erosion. (Fig. 80.) Even when erosion is moderate the removal of the fertile surface

Figure 80.—Destructive erosion resulting from inadequate vegetation protection of the surface soil, in the southern Appalachian Mountains

soil seriously reduces the productive capacity of the land. The greatest damage occurs when hillside fields have been abandoned directly following clean cultivation, for the soil has no protecting cover of grass or other densely rooted vegetation. On some lands gullying has proceeded so far as to render the land practically worthless. (Fig. 81.)

In western North Carolina 25 years ago, for example, tobacco lands were cleared during the winter, cropped for three or four successive years, and then entirely abandoned for newly cleared fields. The first year after abandonment these fields were seriously injured by erosion. To-day the fields abandoned when this system was practiced still present a serious problem of reforestation.

Although gullying may not be in evidence each heavy rain carries away a part of the unprotected loose surface soil so that the cumulative

damage during the year may be tremendous. When this washing of loose soil occurs it frequently happens that there is no conspicuous evidence of damage until the soil is completely washed away to the bed rock.

FIGURE 81.—The result of careless treatment of abandoned farm land in the Appalachians. Deep gullies have rendered the land practically worthless

Where deep gullies have already developed they must be stopped by mechanical barriers. Stones and brush have been employed for stopping small gullies. Under some circumstances the seeding of orchard grass, Japanese clover, or other suitable vegetation on the gully slopes has been successful. It is a common practice in some sections to cut the young trees that may have become established on an eroded area and to throw these into the gullies in an attempt to prevent further washing. This does not appear to be the best policy, for living trees themselves are very efficient in protecting the soil.

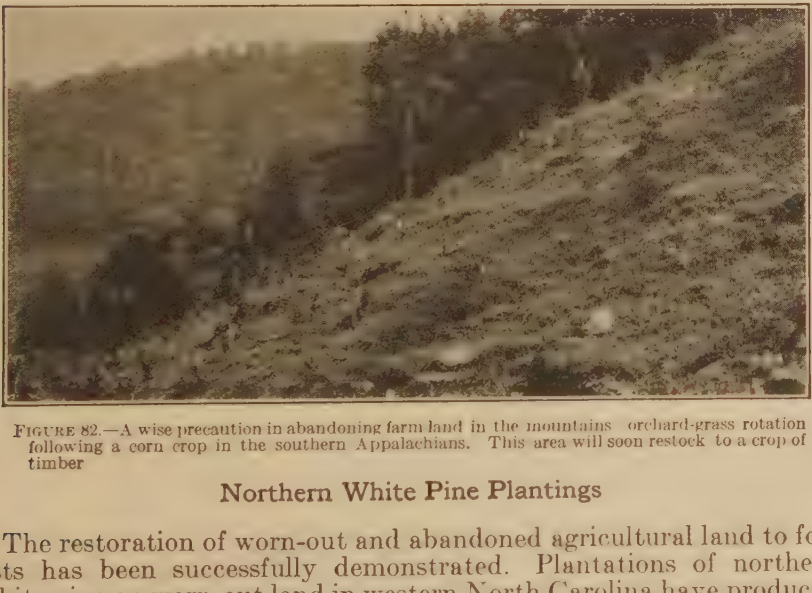

FIGURE 82.—A wise precaution in abandoning farm land in the mountains orchard-grass rotation following a corn crop in the southern Appalachians. This area will soon restock to a crop of timber

Northern White Pine Plantings

The restoration of worn-out and abandoned agricultural land to forests has been successfully demonstrated. Plantations of northern white pine on worn-out land in western North Carolina have produced

excellent returns. Where abandoned fields are adjacent to timbered areas with seed trees, natural restocking will take place. To promote this, excessive surface erosion before the seedlings have become established must be prevented. This can be done by seeding the fields to grass following cultivation, in case no other cover is present. The area must also be completely protected against fire. Some erosion will of course take place while the land is gradually being claimed by young trees, particularly when the restocking is very light and other vegetation cover is inadequate. Even gullying may occur. Under such circumstances, and also when the abandoned areas are extensive or seed trees unavailable, planting must be resorted to if a satisfactory stand of timber is to be expected.

With some effort on the part of the owner cleared mountain land no longer required for agriculture may be converted into permanent pasture or temporary pasture that may later become restocked to a timber crop, which, in addition to insuring the owner a reasonable rent return will protect the soil from erosion and actually increase its fertility through the addition of organic material in the form of leaf litter and detritus.

C. R. Hursh,
Associate Forest Ecologist, Forest Service.

FORESTRY Cause Is Helped by Northwest Chambers of Commerce

Though members of chambers of commerce or other business organizations may live within a region containing almost half the remaining virgin timber of the United States it does not necessarily follow that they are interested in forestry. With heavy forests all around them, in what is still a new country, it would be only natural for them not to worry unduly about the future forest. Until a few years ago this was the situation in the States of Oregon and Washington. However, with Washington leading and Oregon second in annual lumber cut, and with the cut-over areas in the two States running over 300,000 acres annually, this attitude is giving way to an active interest in future sources of raw material for the region's dominant industry—lumbering.

There are now forestry committees in 21 chambers of commerce in these two States. The first of these committees was started by the chamber of commerce of Seattle, the dean of the State forest school of Washington, and a local forest supervisor six years ago. Some of the things for which the committee worked are a study of forest taxation, improvement of State forest fire laws, forestry education in the public schools, reduction of smokers' fires, abatement of the summer smoke nuisance, leaving roadside strips of timber, setting aside of State forests, and the formation of a State forest policy.

Later, the Klamath County Chamber of Commerce, in southern Oregon, put on annually a stop-forest-fires campaign which was successful in awakening local business men not only to the need of fire prevention but to the problem of growing future forest crops.

Accomplishment In Oregon

An outstanding example of effective accomplishment is the work of the forestry committee of the chamber of commerce of Portland, Oreg.,

in securing the passage of a forest-taxation law in 1929. This committee, headed by a banker, succeeded not only in interesting in forest taxation the majority of the bankers of the State, but in bringing about the organization of a forestry committee in the State bankers' association. With the lumber industry the dominant one of the region, every banker needed to be informed on forest-taxation matters and to know something of the problems of growing wood crops.

This Portland committee is taking a keen and active interest in forest research, State forests, forest protection, more topographic maps for the State (to be secured through cooperation of Federal, State, county, and municipal agencies), public land laws, roadside timber strips, arboretums, and many other phases of forestry. Forestry committees in the smaller towns are interesting themselves in State and Federal legislation as well as in more local matters such as roadside planting, the smoke nuisance from brush fires as it affects the summer-tourist business, smokers' fires, future timber supplies for local sawmills, and local demonstration forests.

JOHN D. GUTHRIE,
Assistant District Forester, Forest Service.

FRUITS and Vegetables in Growing Demand Among All Consumers The contents of the consumers' market basket present a vastly more varied assortment of fresh foodstuffs than in the so-called "good old days" or even than a few years ago. Common necessities of to-day were in the luxury class and were frequently unobtainable 20 years ago.

This change in the daily diet of the average family is due to a number of influences, the principal ones being the (1) development of large-scale production in new areas which supply fresh fruits and vegetables during seasons when home-grown or locally grown produce is not available; (2) increasing popular appreciation of the value of green stuffs in the diet; (3) continued improvement in grading, packing, and handling on the way to the retailer; (4) more general display of these goods by chain grocery stores; and (5) distribution by motor truck to small towns and even to individual farm and village families. Constant abundance has resulted in prices within the reach of almost every consumer. Instead of depending upon the root cellar, the dealer offers produce fresh from the fields—tender, crisp, and appetizing—every month in the year and usually at moderate prices.

The menu of the average family of to-day can be well balanced throughout the year with head lettuce, fresh peas, spinach, kale, new cabbage, string beans, new carrots, green peppers, eggplant, and other fresh vegetables, citrus fruits, and apples. During the early spring and late fall this list can be supplemented by such fresh produce as was formerly out of season—green corn, new potatoes, grapes, plums, pears, peaches, strawberries, watermelons, cantaloupes, and kindred types of melons—all from distant regions. This menu is in sharp contrast with the former steady winter diet of meats, cereals, and fruits and vegetables that had been stored for long periods, or canned.

Our large consuming and distributing markets now draw their supplies of fresh fruits and vegetables from all parts of the United States

and a number of foreign countries. Favorable climatic and growing conditions, particularly in the States of Arizona, California, Florida, and Texas, have made possible the production of fresh vegetables on a gigantic scale for shipment during the winter and early spring. In some other States, particularly Colorado, conditions are especially favorable for the production of a late fall crop of such commodities as cauliflower, green peas, lettuce, and cantaloupes, which are shipped fresh to all large markets.

Tremendous Increase in Some Vegetables

The increase in production of some of these fresh products has been almost phenomenal. The most striking examples are lettuce, green peas, tomatoes, and carrots. Ten years ago the commercial acreage planted to lettuce totaled in round figures only 16,800 acres, and the total number of car-lot shipments reported to the Bureau of Agricultural Economics was only 7,000 cars. In 1928 we had 127,000 acres, and the shipments amounted to over 51,000 cars, or more than seven times the movement during 1918. Among the vegetables the movement of lettuce in car lots is now exceeded in volume only by potatoes. In addition to these car-lot shipments, millions of city dwellers on both coasts are supplied largely by motor truck direct from the farm to the city market.

The increase in the production of green peas for fresh shipment has also been rapid. In 1918 we had only 6,000 acres, and the car-lot shipments were 691 cars, whereas in 1928 the plantings had grown to 61,000 acres, and the shipments were nearly 5,000 cars. In addition, 1,067 cars were imported, principally from Mexico.

In 1918 we planted 93,500 acres of tomatoes for market, giving a car-lot movement of 15,000 cars. By 1928 we planted 146,000 acres and shipped 30,500 carloads, while some 6,000 cars were imported, principally from Mexico and Cuba. These figures do not include any tomatoes grown for canning.

Carrots have also made a notable record. In 1924 the commercial plantings were 11,000 acres. In 1928 there were 24,000 acres. The first annual record of carrot shipments, which was secured in 1920, showed a total movement of only 1,630 cars. In 1924 we shipped 3,000 cars. Due chiefly to the growth of the bunched-carrot business in California and Texas, shipments by 1928 had reached 8,800 cars.

This demand for fresh fruits and vegetables is significant of the changing food habits of the American people. There is an increasing and insistent tendency toward a more varied diet. This has been stimulated by the constant display of fresh products at popular prices, made possible by applying the principles of mass production to the agriculture of our winter-gardening areas. The contents of the consumers' market basket are changing rapidly. The proportion of fresh vegetables and fruits is still increasing. The American dinner table thus carries a better pledge than ever before of the healthfulness of the oncoming generation.

Wells A. Sherman,
Principal Marketing Specialist,
Bureau of Agricultural Economics.

FRUIT and Vegetable Receipts by Truck at New York Recorded The quantity of fruits and vegetables moved to market by motor truck has increased rapidly in recent years and is now a considerable part of the supply in many cities. Its determination is important for market news and statistical purposes.

Beginning in July, 1928, the Bureau of Agricultural Economics inaugurated a system of collecting daily statistics of motor-truck receipts of fruits and vegetables in New York City, our largest market. A member of the bureau's market news office telephones each receiver, of which there are more than 100, at a designated time each forenoon for this report. Fairly complete statistics are thus obtained showing the quantity and State of origin of each fruit and vegetable received daily by motor truck on the city's wholesale and jobbing markets. Most of these shipments arrive on the Washington Street market in down-town New York, where the large receivers who sell chiefly to jobbers are located, but receipts on the several other jobbing markets and at chain-store warehouses are included. Receipts on the farmers' markets are not included.

The records disclose that the quantity which arrived by motor truck was equivalent to 15,108 carloads, or 8 per cent of the domestic supply during the 12 months beginning with July, 1928.

Origin of Motor-Truck Supplies

Ten States supplied these 15,108 carloads. This quantity was about one-fourth of the total receipts from these same States, as shown in Table 14.

TABLE 14.—*Comparison of motor-truck receipts of fruits and vegetables with rail and boat receipts from the same States on New York wholesale and jobbing markets, July, 1928–June, 1929*

State of origin	Receipts: By motor truck	Receipts: By rail and boat	State of origin	Receipts: By motor truck	Receipts: By rail and boat
	Carloads	*Carloads*		*Carloads*	*Carloads*
New Jersey	7,131	5,017	North Carolina	156	5,528
New York (Long Island)	2,588	4,331	Connecticut	38	22
New York (other sections)	2,058	13,797	Massachusetts	7	579
Maryland	1,115	2,381	Rhode Island	3	6
Pennsylvania	1,068	1,065			
Delaware	665	459	Total	15,108	45,620
Virginia	279	12,435			

New Jersey was the principal source of motor-truck supplies. It furnished 47 per cent of the quantity which arrived by truck. New York State was second with 31 per cent. More than half of the New York State arrivals originated in Long Island. The most distant State from which motor-truck receipts were reported was North Carolina, more than 500 miles away, which supplied about 1 per cent of the total.

The motor-truck arrivals from New Jersey, equivalent to 7,131 carloads, were equal to 59 per cent of the combined rail and motor-truck receipts from this State. A similar comparison for Long Island indicates that the motor truck carried 37 per cent. For an area within a

radius of 100 to 150 miles of New York City it is probable that at least one-half of the shipments to the city's wholesale and jobbing markets are carried by motor truck.

Fruits and Vegetables Carried by Motor Truck

Fifty-six different fruits and vegetables were reported in the motor-truck receipts. Ten of these comprised 61 per cent of the total of 15,108 carloads. These 10 with the percentages of the total motor-truck supply represented by each were: Apples, 9.3; strawberries, 7.7; tomatoes, 6.7; cauliflower, 6.5; mushrooms, 6.3; green beans, 6.1; sweetpotatoes, 5.1; peppers, 5.0; green corn, 4.7; and lettuce, 3.5.

The arrivals of these 10 commodities by motor truck constituted 38 per cent of the total wholesale and jobbing market supply of the same commodities from the same group of States. From this area 50 per cent of the strawberry shipments to New York were by motor truck Corresponding percentages for certain other crops were cauliflower

FIGURE 83.—Motor-truck receipts of fruits and vegetables in Wallabout Farmer's Market, New York City

92 per cent; mushrooms, 95 per cent; green corn, 91 per cent; tomatoes, 44 per cent; and apples, 20 per cent. Motor-truck transportation was particularly important with respect to the highly perishable and more expensive fruits and vegetables.

The month of greatest motor-truck movement was August, when the equivalent of 2,904 carloads arrived The minimum movement was in February, when the equivalent of only 270 carloads arrived.

In additon to receipts on the wholesale and jobbing markets of the metropolis, immense quantities are received by motor truck on the three important farmers' markets in the city. Most of these supplies originate within 50 miles of the city. Complete statistics for the farmers' markets are not available, but reports for April, May, and June, 1929, on two of the three farmers' markets, indicate receipts (practically all by motor truck) equivalent to 3,115 carloads. This is almost equal to the motor-truck arrivals on the wholesale and jobbing markets for this period, which were equivalent to 3,735 carloads. It therefore appears probable that the tonnage brought in by motor truck

to the three farmers' markets exceeds the motor-truck receipts on the city's wholesale and jobbing markets.

The costs of motor-truck transportation of fruits and vegetables vary greatly with such factors as the commodity, the distance from market, and competition among truck owners. In many instances they are approximately the same as costs of transportation by freight including necessary drayage in the market. The principal disadvantage of the motor truck as a carrier of fruits and vegetables as stated by city dealers and shippers is the greater uncertainty of market supply, resulting in greater price fluctuations than when a definite number of cars of a commodity are known to be on hand for the day's market. Some of the advantages are: Less handling both in the producing district and in the market because of elimination of loading and unloading of cars, and quicker transportation from many sections, which often means that fruits and vegetables arrive on the market in better condition.

J. W. PARK,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

FUTURES Market at Times May Enable Farmers to Hedge Speculative Risks

Can the individual farmer ever use the futures market to advantage in the marketing of his crops? He can at times and under certain conditions. There is danger, however, of being intrigued by its speculative possibilities and of failing to consider it solely from the standpoint of protective utility.

The facing of risks is so much a part of the everyday life of the average farmer that he is inclined to take chances and carry risks affecting his crops as a matter of course. With respect to growing crops he must face continually the risks incident to weather and insects as well as the risks of unfavorable prices. Whether his crops will be marketed at a profit or at a loss is oftentimes a matter of conjecture.

There are forms of insurance available to cover certain of the farmer's risks, but the risk of unfavorable price returns is one against which he does not have any sure means of protection at all times. This risk commences even before the planting of the crop and continues until the crop is sold or otherwise disposed of.

There is perhaps no way in which the grain producer can avoid carrying throughout most of the growing season the risks arising from price fluctuations. Through proper use of the futures market, however, he may be able at times to take advantage of a profitable price situation when it presents itself although the actual crop be not at the moment in a salable position.

"Pegging" an Attractive Price

Speculative activity, or some unusual development, may advance prices to an attractive figure at a time when a farmer's crop is assured but before it is ready to be moved immediately to market. In that event, provided there is a proper relationship between cash grain prices and futures prices, it may be possible by selling futures to "peg" this attractive price for later use. This would be in the nature of a hedge

and would be accomplished by selling that future which is most likely to bear a uniform relationship to the cash grain to be marketed. By cash grain is meant the actual grain which the farmer has to sell.

Assume that a farmer is reasonably certain of having 3,000 bushels of corn which will grade No. 3 in December and which he is willing to sell at, say, 80 cents per bushel, basis Chicago. Should the Chicago December future reach a point that suggests 80 cents per bushel for No. 3 corn in Chicago he will sell 3,000 bushels of the December future. Having done so, and having protected his sale by ample "margin," he may feel reasonably sure of realizing 80 cents per bushel for his cash corn, even though the market declines and is below that price at the time he can deliver the actual corn.

To illustrate: On October 1, a farmer sells 3,000 bushels of the December future at, say, 83 cents, it being thought that No. 3 corn in December will be selling at no greater discount under the December future than 3 cents per bushel. (No. 3 corn under present rules is deliverable on Chicago futures contracts at 2½ cents discount.) By December 15, when the cash corn is ready for delivery and sale to the local elevator, prices may have declined 10 cents per bushel. Instead of receiving a price which with freight and handling charges added would be equal to 80 cents per bushel, basis Chicago, a price is received equal to only 70 cents per bushel. Having sold the December future, however, at 83 cents, it may now be bought back at 73 cents, or at a profit of 10 cents per bushel. This profit added to the 70 cents per bushel received for the cash corn will give the original price objective of 80 cents per bushel.

Situation in Rising Market

If prices, instead of declining, advance 10 cents per bushel the situation will be reversed. The farmer then will realize 10 cents per bushel more for his cash corn but will lose this amount in having to buy back the future at 93 cents, so that in either event the effect will be to fix the realized price at 80 cents per bushel.

The foregoing is offered merely as an illustration of how the futures market may be used at times to shift a price risk. A hedge does not always work out in the manner indicated. Whether it does or not depends upon the relationship between cash prices and futures prices being maintained. This in turn is affected by grade differences and other factors, all of which must be taken into account and studied carefully. However, the hedging possibilities of the futures market are worthy of serious consideration. Occasionally they offer opportunity to secure higher prices than are obtainable when the actual grain is ready for market.

Hedging operations may not be engaged in safely without a careful survey of all of the possible factors involved, such as ability to deliver the cash grain and to meet all possible margin requirements. By margin requirements is meant the deposit of funds which commission firms require to protect these contracts in the case of adverse market changes.

Additions to margin funds must be made sometimes on very short notice. Sometimes spreads between cash grain prices and the futures prices will develop to modify or destroy the protective effect of a hedge even after it is properly placed. The hedger must be constantly alert to these possibilities if he would be successful.

Other Types of Hedges

In this discussion reference has been made to just one type of hedging transaction. There are others. For example, the livestock farmer who is interested in buying grain as cheaply as possible may sometime see futures prices reach a point that reflects a favorable basis for meeting his feeding requirements. The cash grain may not then be immediately available or it may be that he is not then prepared to receive and care for any large quantity. Under such conditions he may go into the futures market and buy futures with the idea later of buying cash grain and selling the futures. Except for the purchases and sales being made in reverse order the latter kind of hedge is like the one first discussed; both go to the purpose of taking advantage of a favorable price opportunity when one appears.

In neither of the examples suggested does the farmer expect to make any money through speculating on prices. On the contrary, he merely selects a price point in the futures market which reflects a satisfactory price for cash grain and, by hedging, converts a presently available price into one which is available at a later date instead.

In all hedging transactions care must be taken not to become involved in dealings that are purely speculative in character. There is a vast difference between seeking protection against an existing price risk and in seeking other and additional risks in the hope of speculative gain.

J. M. Mehl,
Assistant Chief, Grain Futures Administration.

GASES' Response to High Pressure and Temperature Shown The nature and properties of gases have challenged the interest of the philosophic and scientific world ever since the time of the ancient Greeks. To Van Helmont (1577–1644) must go the honor of giving the present name to this form of matter. To Lavoisier (1743–1794), a remarkable experimentalist, must be given the credit for discovering the real chemical nature of gases. The experimental work of Boyle (1627–1691), Charles (1746–1823), and Gay Lussac (1778–1850) on the behavior of gases under changing conditions of temperature and pressure has led to a statement of what is known as the "ideal" gas law $PV=RT$, in which P is pressure, V is volume of a given gas mass, T is temperature on the absolute temperature scale, and R is a constant.

This same expression has since been derived inductively by Clausius and independently by Krönig (1857) by making certain assumptions regarding the nature of a gas. For instance, the gas molecules are assumed to be separate particles with perfectly elastic properties. They have mass but occupy no space and there is no attraction between particles. The particles are in rapid motion and their total energy content may be expressed as kinetic energy ($\frac{1}{2}n\ mc^2$), where n is the number of particles, m the mass of each particle, and c the average velocity of the particles. A gas that conformed to all these conditions would be an ideal gas and would conform rigidly to the above formula.

From this expression, it is evident that the pressure volume product is independent of pressure or volume, and that its change with temperature is linear. Employing the same criteria it is easy to show that such properties as the viscosity, the specific heat, and the heat conductivity of a gas must also be independent of pressure. This law, however, has all too frequently been used in the calculation of the specific properties of "real" gases in engineering design and in studies of equilibria in gas reactions. Real gases do not conform to this law even under moderate changes of pressure, volume, or temperature, except at certain purely coincidental points known as "Boyle points." In general real gases approach more nearly the ideal at high temperatures and low pressures, but the relationships are complicated and not yet fully understood.

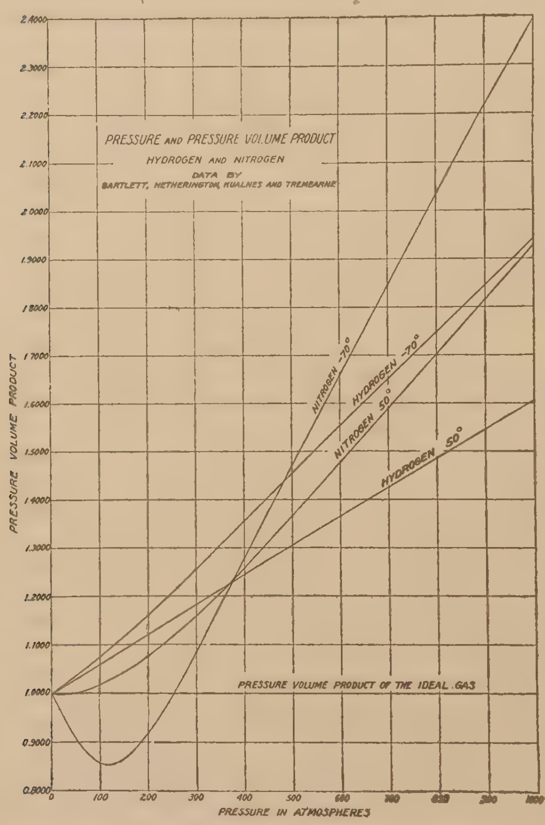

FIGURE 84.—The effect of pressure on the pressure volume product of nitrogen and hydrogen

Attraction Among the Molecules

It is certain that molecules do occupy space and that the free volume is thereby reduced. In the light of modern concepts of the structure of the atom with its minute electrons and protons, it is probable that this space is little more than a sphere of influence. It is almost as certain that there is attraction between the molecules, an attraction that amounts essentially to an increase in pressure and in its aggregate effect is largest when the molecules are closely packed. Therefore, both V and P in the formula must be modified with changing conditions, and their product can not remain constant. Likewise, modern physics pictures a molecule that not only increases its speed and hence its kinetic energy, as heat is applied, but which spins on its axis, and if there are two or more atoms to the molecule they vibrate much as though they were connected by a band of rubber. There are also electronic changes resulting from collisions and perhaps other energy-consuming processes which obviously will affect the specific heat, the heat conductivity, and viscosity, since the magnitudes of these effects vary with changing conditions of temperature and pressure.

In order to show clearly the extent to which the physical properties of real and ideal gas differ, a series of diagrams are presented in which are shown the effects of pressure on the properties of certain

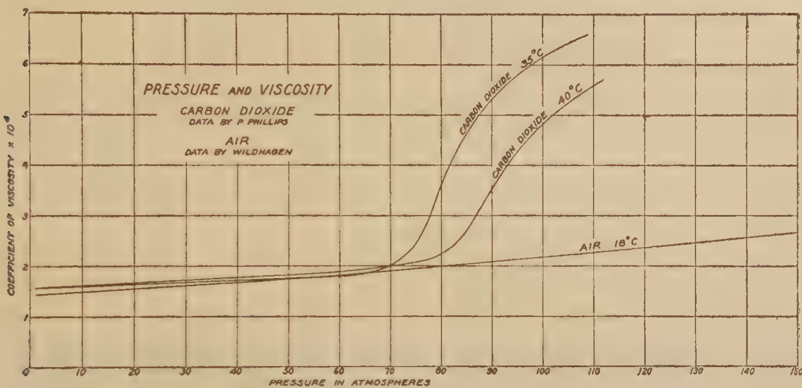

FIGURE 85.—The effect of pressure on the viscosity of carbon dioxide and air

common gases. Figure 84 presents the *PV* products of nitrogen and hydrogen at two temperatures and at pressures to 1,000 atmospheres, it being assumed in each case that the initial volume is 1 liter at one atmosphere at the temperature of the experiment. The dip in the nitrogen curve at the lower pressure and temperature is characteristic of all gases at low temperatures and becomes more pronounced as the critical temperatures are approached. It is apparent that at 1,000 atmospheres pressure and 0°, nitrogen, for instance, occupies more than twice as much space as the same quantity of an ideal gas, while at 100 atmospheres its volume is less than that of an ideal gas. In a similar manner Figure 85 shows the effect of pressure on the viscosities of carbon dioxide and air. The carbon dioxide is at a temperature not far removed from its critical temperature (31.1° C.). While still a gas, its density at the higher pressures is similar to that of a liquid. (At 35° and 100 atmospheres pressure the density is 0.7 that of water.) Its viscosity at these pressures may, therefore, be partly due to the same

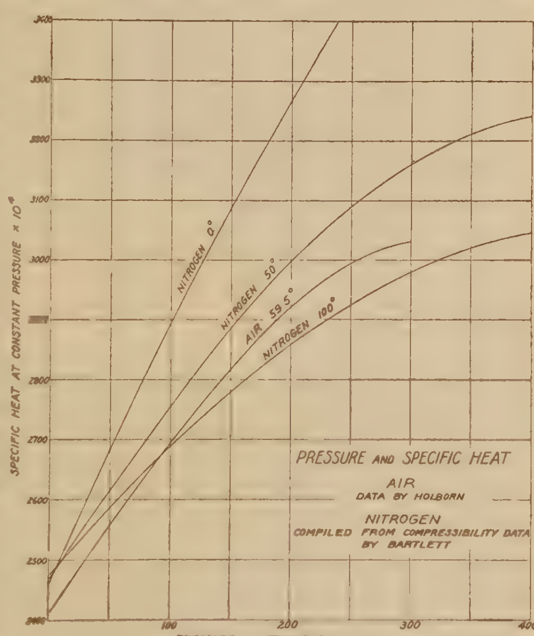

FIGURE 86.—The effect of pressure on the specific heat of nitrogen and air

cause, i. e., friction between molecules, which appears to be the principal factor in causing viscosity in liquids. However, even the viscosity of the air, far removed from its critical temperature, increases more than 100 per cent over a 120 atmosphere change in pressure.

Effects of Pressure on Molecular Motion

Figure 86 pictures the effect of pressure on the specific heats of air and nitrogen. High pressure tends to restrict intra- and intermolecular motion and possibly causes some association of the molecules. If heat is added and the compressed gas allowed to expand at constant pressure, extra energy is required to bring the gas to its new condition in which these phenomena are less pronounced.

While a large number of data are available dealing with the pressure-volume temperature relationships of a number of real gases, relatively little or nothing is known of other properties of gases under extreme conditions of temperature and pressure. These properties can not be predicted with certainty. The problems of their accurate experimental determination are complex and will continue for many years to require for their solution and correlation the skill and patience of master minds.

EDWARD P. BARTLETT,
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GIN Efficiency an Important Factor in Cotton Quality

What are the gins doing to our cotton, is a question foremost in the minds of those interested in the cotton industry. If the many protests from this country and abroad may be taken as a criterion, the ginning preparation of American cotton is not as good as it used to be. Moreover, unofficial estimates by members of the industry indicate that improper ginning causes an annual financial loss in the market value of the American cotton crop that runs into millions of dollars. Such estimates, moreover, are based on the art of cotton classing; much injury and damage, expressed in terms of the fiber qualities on the seed, escapes this method of valuation.

Evidently ginning is an important factor influencing the quality of the American cotton crop and, as such, may be considered a vital step in the production of raw cotton, affecting not only southern agriculture but all consumers of American cotton.

The grade, staple, and character of the ginned lint may be appreciably influenced by the ginning and cleaning processes, but chief attention has been directed to the effect of ginning upon that element of quality known as grade. This seems to have been due to the more visible and tangible nature of the grade factors—foreign matter, color, and so-called preparation, the latter of which includes roughness, neppiness and the extent to which it is gin cut. The effect of ginning upon staple length, for instance, has been considered only in those cases in which the lint has been so severely broken and roughened as to warrant a penalty. Recently, however, information has been obtained relative to the effects of ginning upon the elusive and little understood factor of character, as expressed through the uniformity of fiber lengths, strength, etc.

Method Used In Ginning Studies

The department in 1928 began a series of ginning studies involving both experimental ginning and cleaning and a partial survey of commercial gins. In these studies the fibers removed by hand from seed cotton [7] and the fibers in the ginned lint from the same lot of seed cotton are arrayed according to length. (Fig. 87.) The weights of the different lengths are determined on microchemical balances, under controlled conditions of temperature and humidity, and the results obtained permit the construction of curves for uniformity of fiber lengths. The curves for the hand-pulled sample represent the most nearly perfect ginning and they approximate, as near as it is now possible to determine, the true distribution of fiber lengths as they occur on the seed in nature. The difference between the two curves reveals the nature and extent of changes in the proportion of fibers of various lengths which resulted from ginning.

Figure 87.—Arrays of cotton fibers, showing the variation in length of fibers from the same lot of seed cotton. Note the high degree of uniformity in the hand-pulled sample (A) and the low degree of uniformity in the corresponding saw-ginned sample (B). The difference indicates changes resulting from saw-ginning which properly might be described as inefficient

A marked example of the effect of ginning upon the length of fibers is illustrated in Figure 87, as shown by the high degree of uniformity of fiber lengths in the hand-pulled sample and the low degree of uniformity in the saw-ginned sample. Results obtained from larger samples show that only about 61 per cent of the fibers in the ginned lint are 1 inch and above as compared with 86 per cent in the hand-pulled sample. This difference of 25 per cent appears to be rather large even for such long cotton. Further, the percentages of the longer lengths are smaller and the percentages of the shorter lengths are greater in the saw-ginned sample as compared with the corresponding lengths in the hand-pulled sample. As a result of the two different methods of ginning the spinning utility of the two samples of lint from the same lot of seed cotton would differ markedly.

These laboratory results indicate the nature and extent of changes in fiber lengths which may result from ginning, some of which is also detectable by the art of cotton classing. However, these changes ordinarily would not be detected in an examination of only the ginned lint.

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[7] The fibers from the seed cotton are carefully removed by hand after being "butterflied" on the seed.

Ginning Efficiency Varies Widely

It is generally known that gins are variously operated throughout the Cotton Belt and the results from preliminary studies indicate wide variations in efficiency. Effort is being exerted to determine for cottons of different grade, staple, character, and moisture content the relative importance of the many different factors operating during the cleaning and ginning processes such as speeds, settings, seed-roll density, pitch and condition of teeth, etc. The effects of such factors are being defined not only in terms of uniformity of fiber lengths, but of neps and strength. Finally, the fibers, cleaned and ginned under experimental conditions, are being spun into yarn in order to facilitate proper interpretations in terms of spinning behavior and yarn properties.

Work of this type is fundamental as it is essential to the development of scientific technic for ginning and for the study of ginning. Such information, moreover, should suggest opportunities for improvements in gin machinery, organization, and operation and serve as a basis to educational work in the interest of better custom ginning.

Robert W. Webb,
Cotton Technologist, Bureau of Agricultural Economics.

GOVERNMENT Printing Office Finds Yearbook Its Biggest Single Job This Yearbook, the thirty-sixth that has been issued by the Department of Agriculture, is the largest single piece of printing produced in the largest printing plant in the world, namely, the Government Printing Office, in Washington. More than 400,000 copies of the Yearbook are

Figure 88.—Government Printing Office composing room in 1861

issued for distribution, mainly by Members of Congress. In fact, the publication is issued as a House document, though the subject matter is, of course, furnished by the Department of Agriculture. Twenty thousand copies are ordered by the department. The rest of the edition is placed at the disposal of Congress.

In printing 400,000 Yearbooks the Government Printing Office uses more than 1,300,000 pounds of paper. It uses also 55,000 yards

of vellum-cloth cover, 170,000 pounds of binder's board, 7,020,000 yards of thread, 1,400 yards of crash, and 5,600 pounds of glue. The completed books if stacked one upon the other, would reach a height of approximately 11 miles. These details may give a better idea of what is involved in the publication of the Yearbook than would be given by a mere statement of the cost of the work.

Though, as already noted, the Yearbook is the largest single piece of printing done annually in the Government Printing Office, it represents only a small fraction of the total printing done in this great establishment. The Public Printer purchases more than 50,000,000 pounds of paper a year, a quantity that if made up into octavo books would form a pile over 500 miles high.

FIGURE 89.—Part of the linotype section in the present Government Printing Office. The Congressional Record is set in this section

In 1861, when the Government Printing Office began operation as a Government unit, it was comfortably housed in a small 4-story plant that cost $135,000. It then had 350 employees and an annual pay roll of $170,000. To-day the buildings of the Government Printing Office have 17 acres of floor space. A unit now being built will add 4 acres. When this unit is completed, the buildings, equipment, and materials in the establishment will have an estimated value of $9,250,000. Its employees now number more than 4,000 and their annual pay exceeds $8,500,000.

The mechanical equipment of the Government Printing Office includes the largest battery of typesetting machines in the world. There are 172 linotypes, 90 monotype keyboards, and 129 casting machines. It takes over 15 tons of metal to carry the daily product of these machines. The office has 160 printing presses, ranging from the small platen type to the big machines that print the Congressional Record. One of the big jobs done in the Government Printing Office is the printing of Government postal cards to the number of 6,000,000 a day, or more than 1,800,000,000 a year. Its presses turn out money-order blanks, census forms, and income-tax forms by the hundreds of millions.

Enormous Volume of Printing Handled

Through mass production and efficient management the Government Printing Office handles its enormous volume of printing with accuracy and speed. Costs have been reduced by the use of up-to-date machinery, by standardization of processes, and by improved production methods, so that to-day this office stands as an indispensable adjunct to the Government of the United States. For the production of about 150 daily, weekly, and monthly publications the Government Printing Office maintains special schedules governing the delivery of proofs and of completed work. Similar schedules regulate the handling of overnight work for Congress, such as the Congressional Record, bills, reports, hearings, etc. The demands by the departments for rush work are also very great. Recently, for example, eight distinct jobs of printing were requisitioned by the Department of Agriculture in one day, on each of which a 12-hour delivery was requested; then an urgent demand was made for 60,000 pamphlets on the Mediterranean fruit fly which were required immediately in the campaign against this newly introduced pest. The order was filled, though other department work had to be retarded.

All told, the public documents division of the Government Printing Office distributes approximately 50,000,000 copies of publications yearly. In addition, more than 9,000,000 copies are disposed of by sale. Bulletins and periodicals issued by the Department of Agriculture account for nearly 25,000,000 copies of the total distribution.

FRANK D. SMITH,
Assistant Chief of Publications, Office of Information.

GULLIES May be Filled and Reclaimed by Aid of Small Brush Dams Gullies form quickly on even slightly rolling lands subject to continuous clean cultivation, particularly where the soils are of fine texture and of rather low humus content. They not only reduce the area of the field available for cultivation, but also interfere with farming operations, thereby increasing the cost of production for the whole farm and at the same time decreasing the total yield. Once formed, they enlarge rapidly, and in some sections gullying and sheet erosion together are causing the abandonment of many farms. (Fig. 90.)

The use of brush dams is an effective and inexpensive method of reclaiming gullies where the supply of brush is plentiful. The method is especially applicable for controlling erosion in gullies draining small areas, which do not carry a large flow of water. Brush dams are easily constructed, requiring no particular skill or expert labor. Care must be observed, however, in order that the dams may be effective and permanent, especially where flows of considerable volume occur occasionally.

Loose brush dams may be used where there is but a very small flow of water, as in a gully that extends directly up a field slope and has no tributary gullies. Anchored dams are necessary where there is a considerable flow. In all cases the dams must be tight enough to check the flow materially and must be strong enough to withstand the pressure of the water that collects above them. They must be built with care to prevent failure (1) from washing of the bed or sides of the gully by water flowing under or through the dam, (2) from widening of the

gully by water flowing around the ends of the dam, or (3) from undermining at the lower toe of the dam, by the water that flows over the top. They should also be so placed and of sufficient number that water will not overflow the sides of the gully and cut another gully down the slope.

FIGURE 90.—A gully typical of the kind that, growing in size and in numbers, has caused the abandonment of many fields. (Taken near Guthrie, Okla., 1929.)

Height of Brush Dams

The best height for brush dams is usually about 2 feet. Some of the anchored type have been built 4 feet high, but the pressure of the water behind high dams often forces the silt through them and sometimes causes washing of the bottom and sides of the gullies. In some cases, where the fall along the gully is slight, a height of 1 foot has been considered most satisfactory. The distance between dams depends upon their height and the slope of the gully bottom. The top of the upper side of one dam should be level with the bottom of the dam next above, or a little higher; this will cause filling of the gully between the dams. (Fig. 91.)

Construction of a loose brush dam is very simple. The length along the gully to be covered by each dam will depend largely upon the amount of brush available; the greater this length, the less the danger of the dam being washed out. It is good practice first to cover the bottom and sides of the gully with a layer of straw, grass, or similar material, to protect the soil from the direct erosive action of the water. The finer brush should be placed on this protective layer, and the coarser brush on top. The brush should be placed methodically. Merely dumping a few piles into a gully is of no effect in reclaiming the land, except where the flow of water is very small and the open spaces in the pile happen to be small.

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Butt Ends Should Point Upstream

It is preferable to lay the butt ends of brush upstream in order that the structure shall be compact and strong enough to withstand the pressure of the water that is held behind it. This arrangement makes the upper side of the dam at the butts of the brush higher than the lower side at the tops of the brush. Then the water flowing over the dam will not drop directly upon the bottom of the gully and undermine the dam, but will flow down a slope of considerable length and therefore will be much less likely to cause damage. The dam should be higher at the sides of the gully than at the middle, in order that the overflow shall not erode the sides of the gully and thus enlarge the gully and wash out the dam. Where loose rock is available, added security will be obtained by placing it on top of the dam to compact

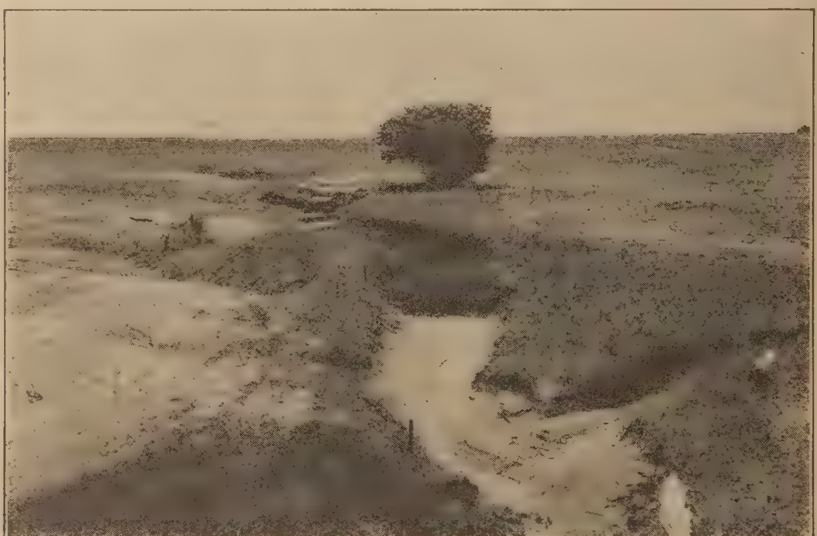

FIGURE 91.—Silt caught above brush dams in gully shown in Figure 90, mostly during one storm of 2½ inches rainfall. (Photograph taken 38 days after Figure 90)

the brush and give greater resistance to pressure of the water collecting above. Silt will collect more rapidly behind a compact dam through which the water flows but slowly than through a loose pile of brush, therefore the tighter structure will cause a more rapid filling of the gully.

Anchored brush dams are built in a manner similar to that described for loose brush dams, with the means of anchoring them added. Such a dam usually extends 10 to 15 feet along the gully. One method of anchoring a brush dam is to drive several rows of stakes across the gully, making the rows 2 feet apart and the stakes 1 foot apart in the row. The gully is partly filled with brush before the stakes are set in place and driven in slightly. Sufficient brush to complete the dam is then placed and heavy wire is stretched along the rows of stakes and fastened to them. Then the stakes are driven down until the wire holds the brush firmly in place, the dam being made lower in the middle than at the sides of the gully.

FIGURE 92.—Pole-anchored brush dams in a gully. Completed dams in foreground; beyond them another dam is being constructed

Anchoring Dams With Poles

Where rock is found in the bottom of the gully stakes can not be driven, but the brush dams may be anchored by using poles. The poles are set diagonally into the lower part of the bank, about 3 or 4 feet apart on each side of the gully, and bent over to the top of the opposite bank. (Fig. 92.) The larger ends are set into the ground, at

FIGURE 93.—Silt caught above brush dams during a storm of 1½ inches rainfall

such an angle that the poles from opposite sides cross about 2 to 3 feet above the bottom of the gully. The brush is laid between the lower parts of the poles and under the upper parts, so that when the tops of the poles are bent down the brush will be held compactly and securely and be lowest in the middle of the gully. The tops of the poles are fastened to stakes driven for that purpose.

The effectiveness of brush dams in causing the filling of gullies is indicated by results obtained on the soil-erosion experiment farm near Guthrie, Okla., where the department has constructed 45 such dams in 1929. Figures 91 and 93 show filling in two gullies on that farm soon after the dams were constructed. Two months after the view in Figure 91 was taken, the gully could have been plowed in and cultivated.

C. E. RAMSER,
Senior Drainage Engineer, Bureau of Public Roads.

HAIRY Vetch Turned Under Greatly Increases South's Cotton and Corn Yields

An increase in the yield of corn from 13 to 40 bushels per acre was sufficiently unique to arouse the interest of many southern farmers last year. The secret of the successful corn grower lay in his use of hairy vetch. When he produced 13.5 bushels per acre on one

FIGURE 94.—Vetch supplies all the nitrogen corn needs. Nitrate of soda at the rate of 200 pounds per acre was applied to four rows of this "vetch corn." Can you tell the difference? These 41 farmers could not

plot of his farm in Conecuh County, Ala., upon which he had applied 200 pounds of superphosphate, no one commented. Even when he gathered 24 bushels per acre from another plot where 200 pounds of phosphate and 85 pounds of nitrate of soda were applied, no particular notice was taken. However, a yield of 40 bushels of corn per acre, which he obtained from land where a crop of hairy vetch had been turned under, could not be overlooked. The results obtained by this farmer and by other farmers carrying on similar demonstrations were brought to the notice of Alabama farmers generally through the efforts of extension workers in cooperation with local farm bureaus. As a consequence of these demonstrations, the cooperative purchase of vetch seed increased from 1,535 pounds in 1918 to 1,127,096 pounds in 1928.

According to a summarized report of hairy-vetch demonstrations for Alabama, average acre yields of corn were increased 22 bushels per acre and of cotton 356 pounds of seed cotton per acre where the crop followed vetch. Farmers who were skeptical that a 100 per cent increase in yield could be obtained through a cash investment of $5 an acre and a little extra labor were soon convinced after seeing the demonstrations. Assuming corn to be worth $1 a bushel, a farmer who invests $5 in vetch seed in the fall should harvest an extra $22 worth of corn the next fall. If he follows the vetch with cotton, he should expect an increase of $21.06 worth of seed cotton at 6 cents per pound. This is a return of more than $4 in a year's time from each dollar invested in vetch seed.

Yields Sometimes More Than Doubled

The Alabama Agricultural Experiment Station has maintained that the State average yield of 15 bushels of corn per acre can be doubled easily when vetch is successfully grown. All farmers who plant vetch are not successful in reaching this goal year after year, but the group of farmers who followed the directions of the county agricultural agents exceeded this claim by 7 bushels during 1928. The experiment station found that a good crop of vetch when turned under usually added to the land nitrogen equivalent to that of 400 pounds of nitrate of soda in its effect on the succeeding crop of corn or cotton; in addition it furnished humus to the soil equivalent to that found in 5 loads of stable manure.

FIGURE 95. Average stalks of "vetch corn" and corn not on check plot compared. The farmers are standing between the two plots of corn

Alabama merely serves as an outstanding example of the growing interest in vetch as a controlling factor in economic production. Results equally as startling were apparent in other Southern States. There is little doubt that the increased yield of crops following vetch has had much to do with the growing interest in this crop, but increased production is only a part of the value of vetch as a farm investment. According to the United States Bureau of Chemistry and Soils, erosion takes $200,000,000 from the pockets of the United States farmers annually. The Mississippi River alone carries 428,000,000 tons of sediment into the Gulf. The greater portion of this enormous loss comes from the soils of the South as they are not frozen during the winter months. The growing of winter cover crops prevents a large portion of this loss of leached plant food and soil particles, protecting the soil at a time when gullying is greatest.

The Arkansas Agricultural Experiment Station made an analysis every two weeks during the winter months of the nitrate content of soil from barren plots and from plots on which cover crops were

grown. On the cover-crop areas only a trace of nitrate could be found at any time due to the fact that the cover crop used the free nitrate made available by plant and animal life in the soil. On the barren plots, however, the quantity of nitrate fluctuated from a trace to 10 pounds per acre which was leached out by the winter rains. From these results it was figured that a total of from 20 to 30 pounds of nitrogen had been lost on the barren plots by leaching. At the same time, cover crops prevented a loss of some of the surface soil particles which are very rich in plant food.

Adds Organic Matter to Soils

In addition to collecting nitrogen from the air and saving plant food that would have been washed away, the cover crop which decayed after being plowed under, added organic matter in which southern

FIGURE 96.—Field of vetch used as cover crop in the piedmont section of North Carolina

soils are usually deficient. Decayed vegetable matter increases the water-holding capacity of the soil insuring against drought damage and facilitating continuous growth and normal fruiting. As all plant food must be dissolved in water and held in solution, a sufficient supply of moisture in the soil insures the greatest profit from applications of commercial fertilizer. It has been shown that 100 pounds of sand will hold 25 pounds of water; 100 pounds of clay, 90 pounds of water; while 100 pounds of decayed vegetable matter will hold 190 pounds of water. The presence of organic matter from vetch turned under also made the usual fertilizer treatment of the crop that followed much more effective.

Decayed vegetable matter also furnished food for millions of little plants and animals that live in each foot of the soil. These plants and animals, like others, must have food, moisture, and air; that is, those which work night and day for our benefit must have air, and this partially explains why plants grow so fast after cultivation and

thrive after a cover crop has been turned under. Another group of these underground plants and animals works in the presence of little air and battles with our friendly soil army which works best in the air. This last army sets free phosphate, potash, and nitrogen used by the crops we grow, while the other, which works without much air, locks these plant foods up, making them unavailable for the use of the plants we grow. Both groups live on vegetable matter we turn under. These half-starved underground plants and animals must have a wonderful time when a crop of vetch or other vegetable matter is turned under, especially on an old "worn-out" cotton field. Of course, the trouble with the old cotton field is that the clean cultivated cotton crop affords little food for our underground friendly army, especially if the cotton stalks are burned year after year.

Vetch Planting Not Costly

Southern farmers have found vetch and Austrian peas fulfill their requirements for a winter cover crop that was "easy to put in," and which could be "turned" in time for a crop the next summer without great cost for seed and liming. Vetch can be planted in cotton or corn middles in the fall at low cost. It will furnish some pasture and can be turned under when "shoe top high." It is easy to turn under at this stage and furnishes enough nitrogen for the corn or cotton crop that follows. Farmers profited by following the vetch "prescriptions" of the extension service and experiment stations of planting early, applying phosphate, and inoculating when sown where vetch had not been grown.

The extension service, in cooperation with the local farm and business organizations, aroused the interest of farmers largely through hundreds of meetings held at demonstrations and through news items and special articles. Vetch-blossom festivals were held and county courthouses and business houses were decorated with the beautiful vetch blossoms. Farmers and business men came long distances with their wagons, buggies, and cars decorated with vetch to enter the parade. They saw "Gen. Hairy Vetch" in action and became interested in his business cards, posters, and platform of general improvement during a State political campaign. Farmers came, they saw, and were convinced of the value of vetch as a farm investment.

C. L. Chambers,
Senior Agriculturist, Extension Service.

HARVESTING Flax With Combine Succeeds in Northern Great Plains Flax for seed is produced chiefly in the hard spring-wheat area of Minnesota, the Dakotas, and Montana. During the last three or four years the combined harvester-thresher has come into use in these States. Although flax generally is more difficult to thresh than wheat, farmers have learned how to handle it successfully with the combine. The condition of the crop, especially as regards weeds, largely determines the method of combine harvesting. Three methods are practiced: (1) Direct combine harvesting of fairly clean flax as soon as fully ripe; (2) allowing the crop to stand until frost has killed the weeds; and (3) the use of the windrow harvester, followed by combine threshing.

Flax reasonably free from weeds can be harvested readily with the combine after the crop is fully ripe and dry. Experienced combine operators are never in any hurry to harvest flax, but wait until the crop is thoroughly ripe. Even when ripe, however, the tough fibrous stems sometimes wind about the moving parts of the machinery. Such parts should be easily accessible so that the stems can be removed without delay. This trouble seldom occurs, however, when the flax is thoroughly dry. Figure 97 shows a combine working under favorable conditions.

Where weeds are abundant harvesting is more difficult. In weedy fields the crop is harvested best by either using the windrower or allowing the flax to stand until after frost kills the weeds. Then they are allowed to dry before harvesting is attempted. Green weeds cause losses in two ways: (1) The seeds, leaves, and stems increase the

FIGURE 97.—Harvesting fully ripened flax with a modern combine at Brockton, Mont., in September, 1928

moisture content of the threshed flaxseed; and (2) some flax seeds are carried into the straw with the weeds. Green Russian thistles are especially difficult to handle with the combine, as they choke the sickle and also become mixed with the threshed seed.

Windrower for Solving Weed Problem

The use of the windrower in harvesting weedy flax appears to offer the best solution of the weed problem. Special windrow harvesters now are made for use in connection with the combine. Flax can be harvested with the windrower as early as with the reaper or binder, and it dries somewhat more readily in the loose windrow than in the larger reaper bunches or binder bundles. The flax plants tangle and cling together, and the windrowed flax is picked up readily with the "pick-up" attachments now used on combines. Practically no loss from flax left on the ground by pick-up attachments was observed in several fields examined in the last two years.

Perhaps the most common method of handling weedy flax at present is to allow it to stand until after frost has killed the weeds. Fortunately, flax usually can stand in the field for some time after ripening without much loss from shattering. Investigations show less loss from shattering or lodging of flax than of wheat, oats, or barley. This is especially true in the western part of the Dakotas and in Montana, where flax seldom is injured by wilt or rust. These diseases weaken the stems and panicle branches so that the flax does not stand so well after ripening. More loss may be expected, therefore, where these diseases occur.

Flax Allowed to Stand Until After Frosts

In October, 1927, a heavy fall of snow in northeastern Montana caught many flax fields unharvested. Later the snow melted and in December the harvest was completed. One farmer in Daniels County had harvested part of a 400-acre field before the snowstorm and completed the job in December. He estimated a loss of about 1 bushel per acre due to the storm, the earlier harvested flax yielding about 11 bushels per acre and the later harvested about 10 bushels. It is a common practice in Montana and the Dakotas to allow flax to stand until after frost before harvesting. This entails some risk of loss from hailstorms and windstorms, but this risk is less than the average loss resulting from harvesting immature or weedy flax.

Grasshoppers and crickets sometimes do considerable damage to standing flax. Grasshoppers bite off the slender branches, causing the bolls to fall to the ground. Crickets, on the other hand, open the bolls and eat the seeds, both on the standing flax and in the harvested flax in the windrow or shock. Where these insects are present, flax should be harvested and threshed as early as possible.

The dehiscence or partial opening of the flax boll is a good indication of ripeness. In flax varieties commonly grown in the United States the boll naturally is semidehiscent, that is, it opens at the apex and cracks along the margins of its five segments when it is ripe and dry. The boll, moreover, is extremely hygroscopic, that is, absorbs moisture readily, closing tightly when wet by dew or rain, or in humid weather, and opening again as it dries. This characteristic can be used as an indicator of fitness for harvesting. In moisture determinations of ripening flax at Mandan, N. Dak., in 1929, the seeds of Linota flax contained from 7 to 10 per cent of moisture when the bolls first became dehiscent. Dehiscence also was observed in all fields where combines were working efficiently.

Moisture Content and Storage

Flaxseed is considered safe for storage when it contains not more than 11 per cent of moisture. In dry harvest weather it usually will contain from 6 to 10 per cent of moisture. A higher moisture content usually is due either to the presence of green weed seeds or to threshing in wet weather. If weed seeds are removed at time of threshing, or immediately afterwards, little difficulty will be experienced in storing flax seed. Recleaners now are available to be used on the combine or for recleaning after threshing. The use of these is to be recommended in threshing weedy flax.

Occasionally a wet fall makes it almost impossible to handle the flax crop without loss in quality and grade due to a high moisture content. In 1926, for instance, much of the crop from Minnesota and the Dakotas, harvested with binders, contained a high percentage of moisture, whereas in 1927 it was comparatively dry. From the 1926 crop nearly 53 per cent of the receipts (3,322 cars) at the Minneapolis market contained between 10 and 12 per cent of moisture, as compared with 8.2 per cent (769 cars) of the 1927 crop. In 1926 only 16.7 per cent (1,050 cars) contained not more than 9 per cent of moisture, whereas 72 per cent (6,777 cars) of the receipts in 1927 contained not more than 9 per cent.

Farmers who raise both wheat and flax are able to make more economical use of the combine because of the longer harvesting season. By the longer seasonal use of the machine the comparatively large investment can be justified. It is estimated that the average cost of harvesting wheat on a large scale with the combine in North Dakota is approximately $1.50 per acre as compared with about $3.30 per acre where binder harvesting and separator threshing is practiced. It is probable that about the same relative costs prevail in harvesting the flax crop.

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HAY Acreage Constant Though Work Animals Have Become Fewer Substitution of mechanical power for animal power on farms and the increase of automobiles and autotrucks in cities have operated to reduce the number of horses and mules in the United States 23 per cent since 1920 although the total acreage of all crops was about the same in 1929 as in 1920. During this period hay acreage has remained about the same although the total number of hay-eating animals expressed as animal units[8] declined about 17 per cent. Considerably more hay per animal unit is therefore now being fed, and there have been some important changes in the demand for different types of hay. Timothy acreage has decreased about 25 per cent whereas legume hay production has definitely increased. These changes may be ascribed to (1) the decline in the number of livestock using nonlegume hays, particularly horses in cities; (2) a gradual shift that has been going on for the last 20 years toward an increased use of legume hays for all kinds of livestock, especially dairy cows; and (3) the increasing importance of the dairy cow.

The number of horses and mules on farms in the United States January 1, 1920, was 25,323,000; January 1, 1929, 19,506,000. The number of horses and mules in cities decreased from 2,084,000, January 1, 1920, to about 1,450,000 January 1, 1929. The aggregate decrease in total horses and mules of all ages on farms and in cities was from 27,407,000 to about 20,950,000. This is a decrease of 6,457,000 head, or 23 per cent. The number of colts under 2 years of age on farms decreased from 3,312,413 to 1,360,000, or 59 per cent.

During this period the percentage decrease in the number of horses and mules on farms, including colts, was greatest in the States north

[8] An animal unit is the equivalent of a mature horse in feed requirements.

of the Ohio and Potomac Rivers and east of the Mississippi and along the Pacific coast. In these States the decrease exceeded 28 per cent in all States except Washington, Wisconsin, Indiana, Delaware, and Maine. The decrease exceeded 26 per cent in the Pacific Coast States, and in Idaho, Arizona, the Dakotas, Missouri, South Carolina, and Louisiana; it was less than 13 per cent in North Carolina; and less than 9 per cent in Alabama, Texas, New Mexico, and Wyoming. In the cotton States of Arkansas, Mississippi, Georgia, and Florida the decline since 1920 has been from 17 to 24 per cent. This decrease in the cotton States named is primarily due to the fact that these States are now cultivating less land than formerly. In Tennessee, the decrease since 1920 has amounted to about 22 per cent and in Virginia and West Virginia to about 25 per cent. (Fig. 98.)

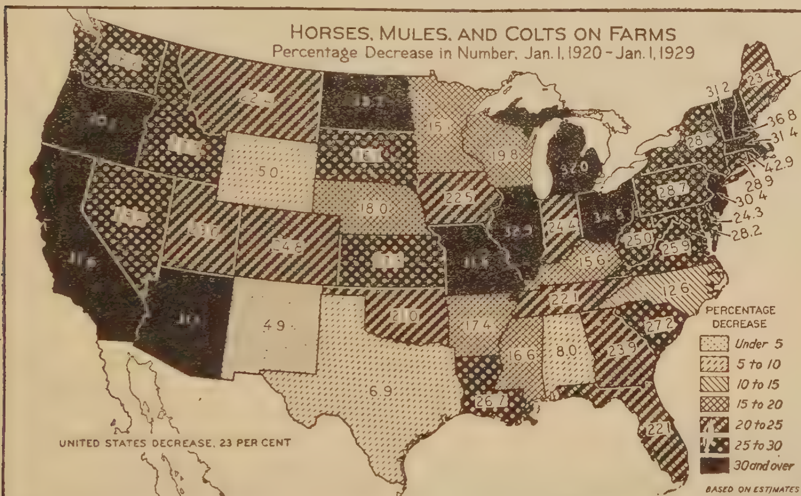

FIGURE 98.—The greatest decrease in the numbers of horses and mules on farms occurred in the eastern and central Corn Belt, in the northeastern hay and dairy belt, and along the Pacific coast

Decrease in the Corn Belt

In most of the States in the eastern Corn Belt and in those to the north and east the percentage decrease in numbers of horses and mules on farms was much greater than in other portions of the United States with the exception of the Pacific coast. This decline in numbers on farms has been a postwar development in most parts of the South and West, but it began much earlier in the North, especially in the Northeast. In New England it has progressed steadily since 1900. In that region the decreasing acreage of crop land was probably the primary cause. In New York and Michigan, the decline began in 1915; in Pennsylvania, New Jersey, and West Virginia it began as early as 1909. In Ohio and Indiana there was an almost steady increase in numbers up to 1913 followed by a gradual decline until 1920 and an accelerated decline since that time.

In general, the reduction in total horses and mules on farms, including colts, since the year of maximum number has been about one-third in the North (excluding Wisconsin, Minnesota, and the Dakotas), about one-fourth in the West, and approximately one-sixth in the

South. Unless there is an accelerated increase in the introduction of improved machinery in the South it is probable that the future decline in horses and mules will not be rapid. In the North and West it seems likely that there may be a further decline in the number of horses and mules.

Assuming that a mature horse or mule consumes, on the average, 2 tons of hay a year, the decrease in horses and mules has reduced the yearly hay requirements for these animals approximately 11,000,000 tons. This reduced need for hay for horses and mules has been reflected primarily in a reduction of the acreage of timothy hay. During the last decade there has been a decrease in the timothy-hay acreage of about 2,879,000 acres, representing a decrease of 25 per cent. During this period there has been an increase in the acreage of alfalfa of 1,909,000 acres, or 21 per cent.

Although the decline in hay-eating animals in relation to hay production has caused the average price of hay to decline, the increasing popularity of and demand for legume hays is indicated by the gradually improved price position of alfalfa and clover hay compared with that of timothy and prairie hay, though legume acreage has increased materially while that of timothy and priarie hay has declined. The maintenance of a large hay acreage in the face of declining price is due to the facts that (1) hay is largely fed on farms where it is grown and therefore many growers have little interest in the price; (2) a reduction in other farm crops usually results in a greater hay production; and (3) in many sections it has a well-established and important place in the crop rotation.

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HAY-STACKING Machines Speed the Work, Reduce Costs, and Save Labor

On many farms hay that is stacked is still pitched on wagons by hand and then to the stack, a laborious method in vogue since the scythe and hand-rake days of a century ago. And this in spite of the fact that a stacker enables the hay producer to stack hay more quickly, more cheaply, and with less labor. True, some farmers have used stackers, discarded them, and gone back to hand methods of stacking, but it was probably because of inexperience, inadequate trial, or the use of a light and short-lived outfit.

A comparison of the requirements when stacking by hand and with stackers forcibly illustrates the speed and labor efficiency of the later method. When stacking by hand a 3-man crew is used almost exclusively. With this crew in loading, two men pitch the hay to the third on the wagon. When the load reaches the stack two men pitch it off to the third, who builds the stack. Such a crew will handle about 3 tons a day per man, a total of about 9 tons.

With an overshot stacker the most common crew consists of 2 men on sweep rakes, 2 men on the stack, and 1 to drive the stacker team, a total of 5 men. This crew in alfalfa or mixed hay will average 6 to 8 tons per day per man, a total of 30 to 40 tons. In wild-hay sections where the frontboard and backboard are used in conjunction with the stacker, a crew of 7 men can put up about 50 to 60 tons daily. (Fig. 99.)

Swinging Stacker Speediest

The swinging stacker is perhaps the speediest outfit of its type. A crew consisting of 6 men on sweeps, 2 on the stack, 1 driving the stacker team, 1 raking scatterings, and 1 cleaning up around the stack (a total of 11 men) will put up from 80 to 100 tons daily. (Fig. 100.)

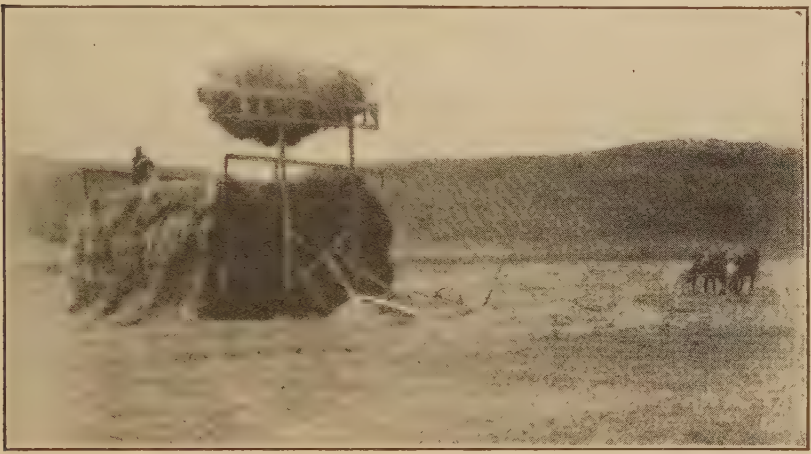

FIGURE 99.—The overshot stacker takes the load from the sweep rake and delivers it over the stacker frame to one point on the stack. In wild-hay sections front and back boards enable one man on the stack to handle the hay which ordinarily requires two men

FIGURE 100.—The head of the swinging stacker carries the hay upward and sidewise and delivers the load to any point on the stack. In the hands of a good operator it has perhaps a greater capacity than any other type

With the combination stacker a 6-man crew is usually the most efficient, and is made up of 1 man on the stacker, 3 on sweeps, 1 on the stack, and 1 to rake scatterings. Such a crew will handle from 35 to 40 tons daily (Fig. 101.)

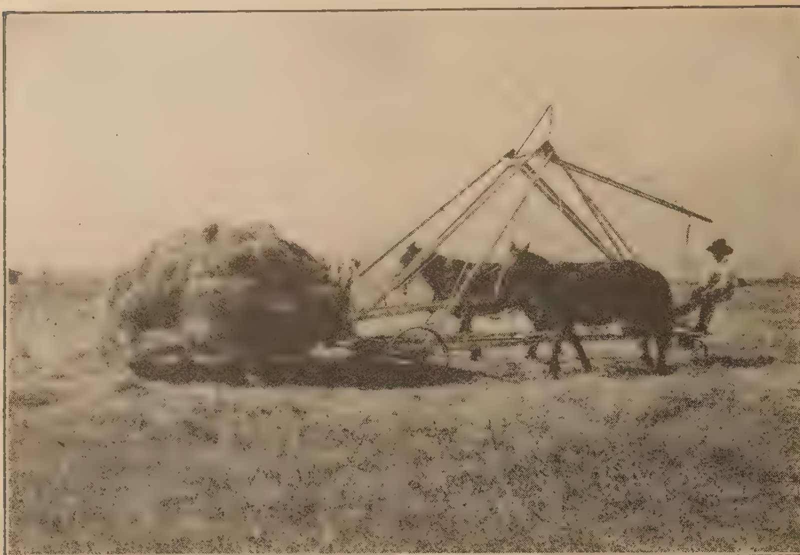

FIGURE 101.—The combination stacker consists of a sweep rake and stacker mounted on wheels. On smooth fields it can be used to take the hay from the cock, windrow, or swath and place it on the stack in much the same manner as does the overshot stacker. Probably its greatest use is at the stack where it takes the hay from the push rakes and delivers it to different points on the stack. This type has a lower daily capacity than some others but its mobility and small operating crew, under necessity, appeal to some

The slide stacker is a rugged homemade outfit built to handle large quantities of wild or mixed hay rapidly. It requires 2 or 3 men on the stack. When stacking wild hay 3 men on sweep rakes, 1 driving the plunger team, 2 on the stack, and 2 to rake scatterings (a total of 8 men) will put up from 5 to 7 stacks, each of 10 to 12 tons, daily. A

FIGURE 102.—The hay is pushed up the slide stacker with a horse-driven plunger. On large stacks a fan-shaped slide reduces the amount of work needed in pulling the hay to the ends of the stack

FIGURE 103.—A cable stacker with which a sling or fork is used to unload the wagon at the end of the stack. This type is especially useful when hay is hauled by wagon and stacked in permanent yards close to the feed lots

6-man crew in mixed hay, which eliminates 2 men to rake scatterings, will put up 60 tons daily. (Fig. 102.)

Stacking with a cable stacker is done at about the same rate as when hay is put in a shed or barn with a hay carrier and sling or fork. When sweeps are used, a 7-man crew with this outfit handles 35 to 40 tons daily. With wagons, a 9-man crew is necessary to handle the same amount of hay. The advantage of this outfit is that stacks up to 200 tons can be built at one setting. (Fig. 103.)

FIGURE 104.—The derrick stacker used with slips excels all other types in handling alfalfa with a minimum loss of leaves and a minimum amount of labor on the stack. It is especially adapted to alfalfa sections where the hay is cured in the cock

Of the derrick stackers, the Mormon style is perhaps the more common and according to operators who use the derrick it excels all others for handling alfalfa. With this outfit and a crew consisting of 3 men operating slips, 1 on the stack, and 1 stacker team driver, about 30 tons can be stacked daily. (Fig. 104.)

The Rope Type

The rope type of stacker, a poor one to use, and limited in its present use to a few scattered localities, has the advantage of cheapness and lightness, but the disadvantage of low capacity. A 4-man crew with this outfit will handle about 16 tons daily. This type of stacker along with others mentioned here is described in Farmers' Bulletin 1615-F, Hay Stackers and Their Use.

TABLE 15.—*Tons of hay stacked per day per man by different methods*

Method	Men in crew	Tons per day per man
Wagon loaded and unloaded by hand	3	3
Overshot stacker and sweep rakes	5	7
Overshot stacker, sweep rakes, and front and back board	7	8
Swinging stacker and sweeps	11	8
Combination stacker and sweeps	6	6
Slide stacker and sweeps, wild hay	8	9
Slide stacker and sweeps, mixed hay	6	10
Cable stacker and sweeps	7	5½
Derrick stacker and slips	5	6
Rope stacker and sweeps	4	4

The human factor requirement for stacking a ton of hay is not the only item governing the choice of methods. When hay is of any importance as a farm enterprise this factor should be given equal consideration with others affecting the practices of handling the crop, if the enterprise is to be a success financially.

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HEMORRHAGIC Septicemia Is a Widely Distributed Disease of Livestock Hemorrhagic septicemia is one of the few livestock diseases that are distributed throughout the entire United States from coast to coast, and from the extreme northern borders to the Gulf of Mexico. Furthermore, it is one of the few diseases that affects practically all species of domestic livestock, as well as many wild animals and poultry. Many outbreaks of this disease, particularly in cattle and sheep, are associated with railroad shipment of these animals. This form of the disease is known as shipping fever and usually makes its appearance a few days after the animals reach their destination. There is little doubt that the shipping lowers the vitality of the animals and they become correspondingly more susceptible to infection.

Although feeder and stocker cattle are most frequently affected, outbreaks of this disease occur also in dairy herds. Sheep, horses, and mules are very susceptible to the infection and as a rule succumb quickly after being stricken. The disease in poultry is known as fowl cholera. Outbreaks occur also in wild deer, buffalo, and rabbits

The extensive losses which the disease has been causing among domestic livestock may be greatly reduced by improved methods of handling and also by vaccination with biological products prepared for the purpose. It is accordingly desirable for livestock owners to be familiar with the nature of the disease and the methods of prevention.

Hemorrhagic septicemia is an infectious disease, caused by a specific germ which may multiply rapidly after gaining access to the body tissues. Outside of the animal body the germ lives in the soil.

Death Rate Is High

The onset of the disease is usually rapid. A marked elevation in the body temperature takes place. Refusal of food and general depression follow. Swellings which are soft and "pit" on pressure may be observed, especially in the region of the throat, neck, and dewlap. There may be difficult breathing or coughing, and a nasal discharge, which at times is blood stained. Strings of mucus frequently hang from the mouth. The disease may spread to the digestive tract, producing in these organs hemorrhages of varying sizes. Such spreading is manifested by a diarrhea which frequently is blood tinged.

The affected animals frequently stand with the forelegs wide apart while the head droops low. The gait is slow and staggering. A rapid loss in flesh occurs, the abdomen becomes "tucked up," and the eyes sink deeply into their sockets. Death overtakes a high percentage of the diseased animals. When recovery does take place, it is slow.

The rapid course of hemorrhagic septicemia together with the swelling beneath the skin may at times cause some difficulty in distinguishing this malady from anthrax or blackleg. Anaplasmosis also has been mistaken for hemorrhagic septicemia. Careful post-mortem examinations, however, reveal the characteristic differences between these diseases.

Effective Control Measures

The causative organism is readily destroyed by the action of the commonly used disinfectants. For this reason the cleaning and disinfection of stock cars and stockyards undoubtedly play an effective part in the control of the disease. It is important, also, to maintain the normal vigor of animals as fully as possible during shipment by proper feeding, watering, and rest and by preventing overexertion, excitement, and exposure.

Susceptible animals may be further protected by the use of bacterial vaccines or aggressins. Such vaccination should be performed 10 days before the animals are shipped, which allows time for the increased resistance to become fully established.

Experimental work conducted by the Bureau of Animal Industry has tended to show that no definite reliance can be placed on vaccination when performed after arrival of animals at stockyards because some of the animals so treated were already infected with the disease in the incubative stage. In these cases the disease frequently ran its course before an appreciable immunity could be established.

Visibly sick animals may be treated with antihemorrhagic septicemia serum. Exceptionally good results have been known to follow the use of this curative serum.

William S. Gochenour,
Associate Veterinarian, Bureau of Animal Industry.

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HIDES and Skins Have Potential Value Often Lost by Mishandling Hides and skins, particularly cattle hides and calfskins, are among the highest price-per-pound raw material products of agriculture, yet they are often treated by raisers and producers with the greatest indifference and with little regard for their potential value.

The tanner at times pays as much as or more per pound for the best flayed and best cured hides and skins of cattle and calves than the butcher does for the dressed carcasses of these animals. There is, however, no fixed relationship between the market value of hides and skins and the dressed carcasses.

The large meat-packing establishments consider that in the case of cattle an average of about 7 per cent of the live weight and about 11 per cent of the value of the live animal is in the hide. This is recognized, within practical limits, by buyers of beef on the hoof and should always be borne in mind by raisers of cattle.

The tanner buys hides and skins solely to make leather from them. He consequently evaluates hides and skins entirely according to the quantity and quality of leather that they will make. The best hides and skins will yield the best and also the most leather. The tanner is willing to and does pay the best price for them.

The farmer should realize that the hides and skins which he raises are an essential raw material for an everyday necessity, leather. He should also realize that the tanner is the ultimate buyer of hides and skins, and that the returns to agriculture from these products will depend upon their value to the tanner or, in other words, upon their quality.

Factors That Influence Quality

Factors that influence the quality of hides and skins can be divided into two broad classes, those of ante-mortem origin and those of post-mortem origin. The raiser of stock is concerned principally with the first class, which embraces all natural and unnatural causes arising during the life of the animal that affect the physical condition of its hide, including grubs, ticks, brands, mange, warts, sores, rubs, bruises, horn scratches, wire scratches, currycomb scratches, prod marks, muck, manure, etc. Their effect upon the quality and quantity of leather yielded by the hide is considered by the buyer and reflected in his offerings for the animal.

True enough, few, if any, cattle and other stock are ever raised for their hides alone. Yet, thanks to Mother Nature, the raising of hides and skins can be combined conveniently with the raising of meats, dairy products, and wool. While the stockman can not be expected to raise his herds "on nursing bottles and fine-tooth combs," yet, for his own benefit, if for no other reason, he should adopt every reasonable precaution and preventive measure against damage to hides and skins.

The quality of hides and skins also depends greatly upon the way in which they are removed from the carcass and prepared for market. Many small-scale producers still have the notion that a hide or skin is a waste product for which any return is so much gain—a shortsighted attitude. The large meat-packing establishments, which set the standards for hides and skins, realize so well their value that separate departments, under close supervision, are set up for the handling of these products, known as "packer" hides and skins.

"Country" Hides and Skins

"Country" hides and skins, that is, hides and skins from animals butchered by farmers and by country and small city butchers, are on the average of poorer quality, primarily because of indifferent and improper handling during skinning and curing. There are a number of reasons for this condition, some of which are pardonable and some inexcusable. The farmer or very small producer with but an occasional animal to butcher can not afford special facilities and does not have the opportunity to develop the skill and acquire the experience necessary to make a really good job of skinning and curing.

On the other hand, many butchers operate on a scale large enough to justify special equipment and facilities, and continuously enough to acquire the skill and knowledge for producing properly flayed and well-cured hides and skins. Yet many of these producers are quite indifferent as to how they treat or, rather, mistreat the hides and skins that they handle.

Part of this indifference is the result of the fact that they have little appreciation of the tanner's hide and skin requirements. Many of these small producers think that four or five cuts in a hide make no difference or that first-quality leather can be made from a half-rotted skin. Little do they realize that one cut or a hole or hair slip from poor curing may render the whole hide unfit for making into some kinds of leather.

Another cause for this indifference probably is the most serious fundamentally of all the evils in the business. It is the prevailing practice of trading in "country" hides and skins on a "flat" basis, that is, without regard to their quality or condition. Offerings are made at so much for the lot, and all too often they are based on the condition of the poorest hides or skins in it. This practice naturally robs the producer of a direct dollars-and-cents incentive to do his best.

There is an increasing appreciation of the necessity of correcting this evil. The principal hindrance seems to be a disposition on the part of each group of interests concerned "to let George do it."

Producer Should Know Quality

The producer must learn to recognize and appraise condition or quality. As far as possible he must eliminate the causes of poor quality, and he should deal directly with recognized, reputable hide dealers or tanners' representatives. He then will be in a position to insist that his products be bought on selection or according to their quality, and not until then will he realize the maximum potential returns in dollars and cents. The tanner needs all the first-quality hides and skins he can get and he is in a position to pay for them. On the other hand, it is partly the tanner's responsibility, as well as his gain, to see that a system of trading with a direct monetary inducement for quality is set up.

Even in flat buying of country hides and skins, however, the businesslike producer of them will find that there is often some discrimination for quality. The average quality of a producer's hides and skins is soon catalogued in the minds of the buyers. As a consequence, the producers of hides and skins of relatively better quality often find themselves in a worth-while strategic marketing position. When hides and skins are moving briskly, they find competitive bidding for

their products, and when the market is dull, with few takers, their hides and skins are among the first to move. So even under the present conditions, some producers find that the extra care and attention that they give to produce better quality country hides and skins pays.

It is difficult to understand why another good argument for first-quality hides and skins seems to have but little weight with the raising and producing groups. We all use leather. More than 325,000,000 pairs of shoes alone are made in this country each year, to say nothing of harness, belts, bags, and other commodities made of leather. Moreover, leather articles are usually intended for hard service. Every cut, hole, or score in a hide or skin means less leather, and poorly cured hides and skins mean less serviceable leather goods. Better hides and skins mean more leather, better leather, and cheaper leather.

R. W. Frey,
Chemist, Bureau of Chemistry and Soils.

HOG Belt's Shift Northwestward Has Economic Reasons Between 1920 and 1925 there was a marked shift in the number of hogs raised in the Northwest. The increase in numbers exceeded 30 per cent in the northern Plains States of Nebraska, South Dakota, Montana, and Wyoming. The increase in Nebraska amounted to 74 per cent, in North Dakota to 71 per cent, and in Montana to 66 per cent. The only other States showing an increase were Minnesota, 14 per cent; Iowa, 19 per cent; Kansas, 27 per cent; Colorado, 9½ per cent; and Idaho 15 per cent; all of which border on the five first mentioned.

Elsewhere in the country the numbers of hogs decreased. In the southern border States, from California to the Atlantic, including the entire Cotton Belt, and northward through Tennessee, Kentucky, Virginia, West Virginia, north to New York and eastward to Maine, the decrease exceeded 30 per cent. Between this group of States and the States showing an increase is a nearly continuous belt of States showing a smaller decrease.

This movement appears to be explainable on the basis of economic conditions. The northern Plains region, where the increase was most marked, is one of high transportation costs to the central markets. But it is well adapted to all the small grains, and recent breeding and selection has resulted in varieties of corn rather widely adapted to the region. Wheat and flax are the only grains sufficiently high priced to permit shipment to distant markets from the region. The other grains are cheap here. The conditions therefore appear to favor pork production. Wheat was rather low priced during much of the period from 1919 to 1925. This was an additional stimulus to the swine industry by lessening competition between it and wheat production. In spite of low prices for hogs during part of the period, they represented the best outlet for much of the grain grown here. The higher price per pound of hogs as compared with the prices of such grains as barley and corn made it feasible to ship them to market.

Development in Accord with Economic Conditions

The development of the swine industry in this region appears to vary with economic conditions, and may be expected to continue unless the price of wheat rises considerably, in which case the swine

industry might cease to grow, or might even become less important than it now is.

The eastern dairy region, the Cotton Belt, and the wide belt of country between the Cotton Belt and the Corn Belt proper are all regions of rather high cost of production for such products. Grain is not abundant and cheap in any of them. Hence the low hog prices that prevailed almost without interruption from 1921 to the late fall of 1924 bore particularly heavily on the swine industry in these sections of the country.

Effects of Fluid Milk Trade

Moreover, the general growth of the fluid milk trade in the northeastern dairy States robbed the swine industry of one of its common supplemental feeds, skim milk. This increased the cost of pork production. The combination of low prices for hogs and the decreased supply of dairy by-products appears to account satisfactorily for the striking percentage decrease in the number of hogs in the eastern dairy States.

The low prices for hogs and the good prices for cotton that prevailed during most of the period under consideration appear to account satisfactorily for the decreasing importance of the swine industry in the cotton States.

The causes of the decrease in the region lying between the Corn and Cotton Belts are not so evident, aside from low hog prices, and the normally high cost of pork production in the region. This is a region in which dairying is developing rather rapidly; it is possible that farmers here are finding milk cows a more profitable outlet for their feed grains than are hogs. If this is the case, the decrease in the number of hogs is probably permanent, but if the low price of hogs is the main cause of the decrease in their numbers, the movement may be expected to become reversed by improvement of hog prices.

W. J. Spillman,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

HOG-CHOLERA Control Is Aided by Knowledge of Other Swine Diseases To what extent hog cholera will continue to take heavy toll from the swine industry in the future depends largely on the farmers engaged in swine raising. Research work, demonstrations, and practical tests on thousands of farms are convincing evidence that in the preventive-serum treatment swine growers have a dependable safeguard against further losses from hog cholera. Are farmers taking advantage of this safeguard? Are swine raisers of the United States adopting and using the method found, through scientific study and experiments, to be the only reliable means of keeping their swine herds free of cholera?

Notwithstanding the fact that State and Federal authorities have for years pointed out the costly ravages of hog cholera and the means of prevention, American farmers still sustain an annual loss of approximately $20,000,000 from this disease. Figure 105 shows graphically the extent of hog-cholera losses in the United States during the period 1884 to 1928, inclusive.

Serum Treatment Prevents Former Large Outbreaks

A study of this chart shows three great waves of increased prevalence at intervals of from 10 to 15 years.

In the years 1913–14 the use of the preventive serum against hog cholera had become fairly well established, and the smaller losses in those years than in 1886–87 and in 1896–97 were a result, no doubt, of the serum treatment. In the fall of 1926 there occurred another series of extended outbreaks of hog cholera in the States of the Middle West. In nine of those States the losses averaged about 70 per 1,000 hogs. Fortunately, other hog-raising States experienced very little cholera that year. The average estimated loss for the entire country was about 51 hogs per 1,000. Thus the use of anti-hog-cholera serum proved to be effective in checking ravages that might have been a repetition of serious outbreaks occurring in former years.

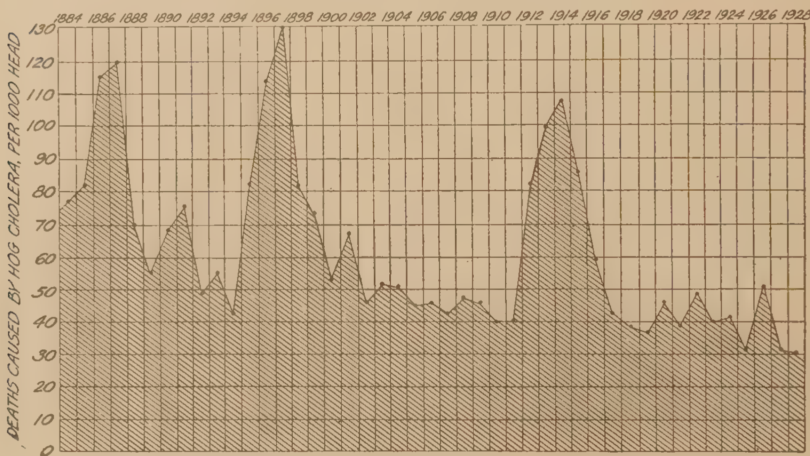

FIGURE 105.—Deaths of hogs, caused by hog cholera, in the United States, 1884-1928

The probable reasons for the apathy of swine owners in protecting their swine herds against hog cholera are interesting to consider. The disease, as already stated, tends to occur in waves of unusual prevalence every 10 or 15 years. In the meantime it appears in sporadic form, outbreaks being rather scattered and, while an individual farmer in a locality may suffer losses, the community as a whole is not aroused to the danger, but lulls itself into a feeling of false security and makes little or no effort toward protection until the next large wave rolls along.

Cost of Immunization Deters Some Farmers

Another reason, probably, is the cost of immunization. Some swine owners believe the cost to be excessive, so that idea tends to curtail the use of the preventive-serum treatment. Untreated herds are susceptible to cholera and consequently are sources of danger to neighborhoods in which the disease is more or less prevalent at all times.

Still another cause of apathy in protecting herds against cholera is the certain amount of skepticism that still exists in farming communities concerning the real value of serum and virus as immunizing agents. From the scientific standpoint it is known that immunization against

hog cholera is entirely reliable. However, there are human elements to be considered and these, at times, have caused the treatment to be ineffectual. An occasional failure is emphasized by the skeptics whereas the many cases of success are ignored.

Diseases Resembling Hog Cholera

Among the causes that may render the serum-preventive treatment ineffectual are: (1) Underdosage of both serum and virus, (2) impotent serum and nonvirulent virus, (3) improper technic in application, (4) lack of attention to feeding immediately before and after treatment, and (5) presence of disease other than cholera in the herd treated. Of these five explanations, in cases where the serum treatment fails to immunize, the last one is the most important.

Several swine diseases closely resemble hog cholera and attention must be given to symptoms and lesions to distinguish them from one another and from cholera. It is important to get all possible information regarding the history of a case before attempting to diagnose the existing disease. The use of anti-hog-cholera serum and hog-cholera virus in herds affected with pneumonia, tuberculosis, swine influenza, necrotic enteritis, or with a severe infestation of internal parasites, is a waste of time and material and may also aggravate the existing condition in the herd. The veterinarian about to inoculate a herd should first ascertain all the facts connected with the case to be treated.

Possibilities of Wrong Diagnosis

In order to show clearly the possibility of error in diagnosis, the cause and symptoms of cholera and of the diseases for which it is sometimes mistaken are summarized briefly, as follows:

Hog cholera: The cause is a filterable virus. Symptoms are loss of appetite, high temperature, listless appearance, arched back, ears and tail drooping, stilty walk, and incoordination of movement in hind legs, cough, occasional thumping, constipation at first, later diarrhea, purple blots on the belly and inner part of the thighs.

Necrotic enteritis: A specific organism, *Bacillus suipestifer*, is associated with the disease, but the underlying or primary cause, as a rule, is allowing hogs to feed on filthy ground in insanitary hog lots and pens. Symptoms are a gradual loss of appetite, profuse diarrhea, weakness, and emaciation. The mortality is high.

Pneumonia: The cause is exposure to cold, wet weather, drafts in shelter houses, inhalation of irritating medicine, or injury to chest walls. A parasite of swine passes through the lungs in its life cycle and may cause sufficient irritation to produce pneumonia, particularly in pigs. Symptoms are prostration, lack of appetite, high temperature, weakness, coughing, and labored breathing. The affected animals are prone to lie with the chest close to the ground in order to get the cooling effect.

Swine influenza (flu): The causative agent has not yet been determined. Symptoms are general prostration and high temperature, cough, rapid breathing, and thumping. The disease affects many animals in the herd but is not highly fatal.

Swine plague: The cause is a specific organism, *Pasteurella suiseptica*. Symptoms are largely those of other pneumonias, namely, prostration, high temperature, cough, and loss of flesh.

Tuberculosis: The cause is the bacillus of tuberculosis. Tuberculosis develops slowly and symptoms are not readily noticeable except in the later stages. Then there are a lack of appetite, cough if the disease is in the lung form and diarrhea if in the intestinal form, weakness, and emaciation.

In view of the many similar symptoms for the various diseases mentioned, the need of accuracy in diagnosis is apparent. The safest procedure is to hold an autopsy on one of the affected animals before attempting to diagnose the disease or outline treatment for the herd. It is advisable to consult a trained veterinarian whose knowledge of animal diseases and anatomy qualifies him for prescribing treatment, and, in the case of hog cholera, to give the correct dosages of virus and serum.

It is important to bear in mind also that immunization is a preventive, not a cure, and that protection is usually cheapest when pigs are immunized before weaning age.

T. P. White,
Senior Veterinarian, Bureau of Animal Industry.

HOG-FEEDING Tests Show that Barrows Gain More than Sows

That hog feeders will get better gains from the feeding of barrows than from the feeding of sows is the conclusion drawn from a study of the influence of sex on feed-lot returns. In order that the results of the study might be conclusive enough to be of real value to feeders, 5,653 hogs, of which 3,018 were barrows and 2,635 sows, were studied during a period of eight years. The barrows outgained the sows by 5.43 per cent, indicating that the sows from the standpoint of gains in the feed lot were only 94.57 per cent as efficient as the barrows.

Figure 106.—Pigs on alfalfa pasture with limited ration of corn

The study which led to the foregoing result was made on hogs in various experiments conducted in practically all parts of the country, under a wide range of climatic conditions and during nearly every month of the year. It included Poland-China, Duroc-Jersey, Chester-White, Hampshire, Spotted Poland-China, Berkshire, Yorkshire, and Tamworth purebreds, as well as a number of crosses between some of these and grades of no known breeding.

Many Systems of Management Included

Hogs under almost every known system of management were included. The results included dry-lot feeding, also hogs on pasture supplemented with limited rations. (Fig. 106.) In some of the experiments a limited ration of barley was fed, followed by a full feeding of

corn; in others this ration was reversed. Such pastures as alfalfa, mixed clovers, and temporary ones, such as rye, oats, wheat, cowpeas, and soybeans, were used to carry the hogs in the study.

In some of the experiments the hogs were full fed from weaning to a weight of about 200 pounds. In others the hogs were started on full feed at weights as high as 150 pounds, and carried along to 500 pounds or more. Practically all known hog feeds, including peanuts and soybeans, were used and the resulting carcasses graded in firmness all the way from oily to hard.

The hogs studied were from sows ranging in ages from 12 months to over 7 years and by boars within the same age limits. Most of the pigs included had been farrowed in March, April, May, September, and October, although a few were farrowed in practically every other month of the year. Some were from sows farrowing but one litter a year, others from sows farrowing two litters.

Results Similar for All Breeds

In compiling the records care was taken not to include animals of either sex unless there were nearly as many of the opposite sex in the same experiment. The object in view was to get definite facts as to the relative ability of both sexes to make gains in the feed lot. All conditions and factors likely to interfere with true results were excluded, so far as possible. The difference in gaining ability in the feed lot was determined by using the average daily gain made during the experiment. The same data showed approximately the same relative differences in average daily gains between barrows and sows in all of the breeds included in these experiments.

E. Z. Russell,
Senior Animal Husbandman, Bureau of Animal Industry.

HOG Marketing Direct from Country to Packer Is Rapidly Increasing

About 24 per cent of all the hogs bought by wholesale slaughterers in this country in 1922 were shipped from country loading points direct to packers instead of being bought at public stockyards. In 1928 the proportion of direct purchases in the total had increased to more than 34 per cent. In Iowa, where approximately one-fourth of the commercial supply of hogs is produced, about one-half of the hogs marketed are now sold direct as compared with one-third in 1920.

The increase in direct buying and selling of hogs has attracted widespread attention and has been a subject of great interest to livestock producers, slaughterers, and market agencies in recent years. Much has been said and written about it. This does not imply, however, that it is a new method of marketing. As a matter of fact it was probably the first method of selling livestock in this country, and has been used to a greater or less extent ever since.

With the establishment of public stockyards and the development of large-scale slaughtering plants located near by, the practice of selling livestock through commission agencies at these yards became rather general. Among the first of the public markets established is that now located at Chicago, the world's largest livestock market. It was opened for business in 1865. Public stockyards are now operating in

67 cities. More than half of these, however, are relatively of little importance as markets for the buying and selling of livestock.

With the westward expansion of corn and hog production into Iowa, Minnesota, and the Dakotas there were established wholesale slaughtering plants in this territory far removed from public markets. Even now no public stockyard is to be found between Chicago and Omaha, or St. Paul and St. Joseph, although between these cities is located the most productive hog territory in this country.

Direct Buying Not New

Those who established the slaughtering plants located in this area started buying hogs from near-by farmers and they have continued to buy direct ever since. Their business increased slowly at first, since the concerns were relatively small and the outlet for their product mostly near by, although some of them specialized in the export trade because they were controlled by men who had formerly operated plants in England and Ireland.

At the outbreak of the World War more than half of the commercial supply of hogs was slaughtered in plants controlled by a few large concerns that operated on a national scale. Most of the plants operated by these large packers were located at public markets, or in or near the large cities of the East. Most of their hogs were bought on public markets.

During the war these national packers increased their operations and were actively engaged in supplying meat products for the fighting forces and for export. In the meantime the domestic business of the local packers located away from the public markets was expanding. In the liquidation and readjustment which followed the war these local packers were able to expand operations still further and compete more actively with the national packers. Because of the character of their business the national packers suffered greater financial losses in the price deflation period of 1920–21 than did the local packers whose operations were confined almost wholly to the domestic market and who were buying more nearly on a hand-to-mouth basis. Consequently the national packers were in a much less favorable position to compete in the buying of hogs during the next three or four years. Marked expansion of hog production in 1923–24 in the territory where the interior packers were located provided these local concerns with an abundant supply of hogs close at hand and some of them almost doubled their business.

Policy Stimulated by Reduced Production

When hog production was curtailed in 1925 and 1926 there was a general scramble on the part of all slaughterers to obtain hogs. In order to get their desired quota the large national packers apparently deemed it necessary to place buying agents in the country to buy direct from producers in the same way that the interior packers were buying. The national packers had always bought some hogs direct, particularly for certain of their plants, but now they began to increase their direct buying operations. Not only did they send buying agents into the country to buy direct from producers but they purchased and put into operation several interior packing plants that for various reasons had been unsuccessful under the former ownership. The plants

thus bought were used for slaughtering hogs bought direct. Increased numbers of hogs also were bought direct for plants being operated at central markets, particularly those located at Kansas City and Chicago.

In the meantime the local interior packers who had always bought direct continued to expand their business. Some of these local packers are now slaughtering around a million hogs annually, practically all of which are bought direct and do not pass through the central markets. In the readjustment of the packing industry, to the changing area of hog production, to new levels in livestock prices, to revised freight rate structures, wages, etc., the interior packers located near the source of hog supply apparently have gained advantages over the packers at the central markets. This is borne out both by the expansion of the localized interior packers and by the policy of the national packers in buying or building additional plants in the interior, rather than in enlarging their facilities at the central markets.

Other factors which have contributed to the expansion in direct marketing of hogs are the improvement of public highways with the consequent increased use of motor trucks for transporting hogs, the development of the radio for market-news dissemination, and the better understanding that hog producers now have of marketing in general.

C. A. Burmeister,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

HOG Weight Affects Yield and Popularity of Market Pork Cuts

A farmer scooped the last of the corn from the wagon box into the self-feeder, and cast a speculative eye over his drove of hogs. He noted their uniformity and thriftiness with pride, studied their fatness, and estimated their weight. "I'll let them roll about October first," he said. "They should be ready."

"Ready? Ready for what?"

"Ready to please the packer's eye and to fill the seller's pocket with the top price. Ready to dress out a high yield of carcass and a high proportion of ham, loin, and other high-priced cuts. Ready to give the consumer chops and roasts that he can use with satisfaction."

Every hog feeder faces the same problem and must make a similar decision. To make it wisely he must have certain facts to guide him. Much is still to be learned about the factors affecting tenderness and flavor of pork products. In fact, that type of research has just been started. There are, however, well-established facts that materially assist the feeder who tries to put his hogs in market-topping shape. Type, quality, finish, and weight are all important. Type and quality are more truly problems of the breeding herd and must be considered when the sows are bred.

Points of Preferred Market Hogs

Finish and weight are the prime considerations in the fattening-pen. They are the two characteristics in which the consumer has chief interest. Finer grading on the basis of palatability will doubtless come, but at present market grades of pork cuts and consumer discriminations are largely based on the size of the piece and the amount

of fat it contains. The preferred market hog must be sufficiently big and fat to dress a satisfactory percentage and produce attractive meat, and sufficiently small and thin to yield "apartment cuts" containing a proper distribution of fat and lean. The housewife prefers small chops that cut four or five to the pound; she likes half a ham that costs under $2; she is partial to bacon in which red streaks of lean are prominent.

FIGURE 107.—In these tests the shoulder was cut three ribs wide

Given a heritage of type and quality, hogs will be ready for market when they have acquired the proper weight and finish; and weight and finish appear to go together. Variations in the type of hog will provide exceptions to this rule, but in the main the heaviest shotes are the fattest ones. This fact was clearly shown in the record of 522 hogs dressed and cut at the department's meat laboratory at Beltsville, Md. (Figs. 107 and 108.) Though the animals had received a variety of rations, practically all would have graded No. 1 or No. 2 for their weight. The Duroc-Jersey, Poland-China, and Tamworth breeds predominated with a good representation of Chester Whites and a few Hampshires.

Weights and Dressing Yields

In the lot were 16 pigs that averaged 102 pounds, live weight. They dressed 74 per cent as compared with the 83 per cent of the eighty 289-pound hogs. Two hundred and sixteen medium-weight hogs, averaging 218 pounds, dressed 81 per cent. One hundred and sixty-nine hogs averaged 181 pounds and dressed 80 per cent. The "light lights" averaged 146 pounds and dressed 79.5 per cent. The packer would certainly prefer the high-yielding, heavy hogs if he could sell their cuts as easily as cuts from lighter hogs.

FIGURE 108.—The method used in removing the loin from the bacon strip

The carcasses from the hundred-pound pigs cut 19 per cent of ham and those from the 289-pound hogs less than 17 per cent. The other groups fitted in between in accordance with their weight. In the same way the lighter hog carcasses cut out a higher yield of loin, rib, head, sausage, and bone than did the heavier ones. The cutting fat, including leaf and back fat from the heavier hogs, weighed over 21 per cent of the cold carcass, that of the 181-pound hogs 17 per

cent, and that of the pigs 11 per cent. Bacon yields ranged from 9 per cent in the case of the pig carcasses to 12 per cent in that of the heavy hogs, and the other classes were in between in order of their weight.

A heavier yield of relatively cheap lard and a high yield of over-finished bacon leave the heavy hog with only dressing yield to recommend it to the market. The light-yielding pig carcass produces greater yields of ham and loin but it has a high proportion of head and feet and rib, or what is known as cutting offal. Moreover, its cuts are immature and often hard to store and make attractive.

The medium-weight hog appears to be the one that is "ready" for market. Its yields are a compromise between those of the others. But its chops and roasts will generally please the consumer as to both size and leanness.

Two Hundred Pounds a Desirable Market Weight

No attempt can be made to select the type, weight, and finish that will be most profitable for the individual farmer to produce. Herd-management problems, local conditions, and current markets must all be considered. The stockman should consider carefully the desirability of sending to market a moderately finished hog that weighs in the neighborhood of 200 pounds. That type does not always top the market. Scarcities of other kinds, extremely heavy runs, and the frequent sale of mixed loads often tend to mask the price margins between the various grades. Yet the hogs that sell first, those selected to fill shipping and special orders, and those most eagerly sought at country points, are usually the ones that answer this description. The dressing and cutting yields of the various weights of hogs indicate that this preference is well founded.

K. F. Warner,
Animal Husbandman, Bureau of Animal Industry.

HONEY Costs Increased by the Great Variety of Containers Used A recent survey of market outlets and demand for honey has disclosed an interesting example of multiplicity of sizes and styles of containers, which increases the necessary cost of distribution.

The situation in New York City is typical of what was found in various retail districts. In 411 retail stores selling honey in the New York metropolitan area, extracted honey was sold in 36 different sizes and styles of containers which ranged from 2-ounce glass jars to 160-pound wooden kegs.

One container, the 2½-pound tin pail, accounted for almost one-third of the total quantity sold by these stores. The 1-pound tin can was second in popularity and the 14-ounce glass jar was third. Over half (56 per cent) of the total quantity sold was packed in these three kinds of containers. A little less than 90 per cent of the total quantity was sold in 12 containers—one-third of the total number.

A total of 19 sizes of containers, on the other hand, was used to sell only 4 per cent of the total volume.

The cost of containers and the cost of handling honey in small quantities are reflected in the prices charged for honey in the various styles and sizes of containers. Generally, honey in tins was from 10 to 15 cents a pound cheaper than honey packed in glass containers of

corresponding size. Honey could be bought most cheaply by the consumer in a 5-pound tin pail, the price of which averaged 86 cents, or 23 cents per pound. At the other extreme was the 2-ounce glass jar, which cost the purchaser an average of 15 cents, or at the rate of $1.20 per pound for the honey it contained. Surprisingly, no difference in price was made by the average retailer between the 2-ounce and the 5-ounce glass jar, as both usually retailed for 15 cents. Honey bought in 5-ounce glass jars cost the purchasers, on the average, 48 cents per pound.

There are only small differences in the sizes of some of the containers. For example, in the New York district, 14-ounce, 15-ounce, 15½-ounce, and 16-ounce glass jars were found; likewise 6-ounce, 6½-ounce, 7-ounce, and 8-ounce glass jars. There was an apparent tendency to use containers with a capacity slightly less than one-half, three-fourths, or 1 pound, to obtain the competitive advantage of selling honey in a container which appears to the consumer to hold 1 pound, for example, but actually holds 1 or 2 ounces less. There was, however, little uniformity in prices charged for honey in containers varying 1 to 3 ounces in capacity. Occasionally 14-ounce glass jars were sold, as an average for a district, at a higher price than 16-ounce glass jars. Again it was found that the price of 14-ounce jars was so much less than the price of 16-ounce jars that honey in the smaller container actually cost the consumer less per pound than in the larger.

A survey of 294 retail stores in Chicago, made at the same time, showed that honey was sold by these stores in 25 different sizes and styles of containers. Three sizes accounted for 55.6 per cent of the quantity sold, which is almost identical with the percentage found in the New York area. Nine sizes accounted for 90.6 per cent of the total volume, whereas at the other extreme, 10 sizes of containers accounted for only 3.5 per cent of the volume.

The price of honey per pound to consumers in Chicago ranged from 23.8 to 44.8 cents per pound, according to the size and style of container in which the honey was packed. As in New York, honey could be bought most cheaply in a 5-pound tin pail and was most expensive to the consumer in a 5-ounce glass jar. None of these retail stores sold honey in a 2-ounce container.

Summarizing, the consumer who purchases small quantities of honey buys it at an excessively high price. Frequently he pays twice and occasionally four times as much per pound as the price of the same honey in a tin container holding 2½ pounds or more. Honey in glass costs the consumer from 10 to 15 cents more per pound than does honey in tin containers of equal capacity.

A. W. McKAY,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

HORSES and Mules Now Raised Are Much Fewer than Replacement Needs

Horse and mule breeders in many States are now protected against the inferior stallions and jacks which were used 25 years ago. While there were many sires of excellent breeding and type at that time, many were only average and others were decidedly inferior. The need

for laws governing this class of animals resulted in the enactment of legislation which now includes 24 States.

Wisconsin took the initiative and passed the first law regulating the services of public-service sires as a means of improving its horses and mules. This law became effective January 1, 1906, and it was the forerunner of similar legislation passed by the States of Iowa, Minnesota, Pennsylvania, and Utah in 1907. Other States followed with enrollment laws until at present the licensing of public-service stallions is required in the following States: California, Colorado, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, New Jersey, New York, New Mexico, North Dakota, Oklahoma, Oregon, Pennsylvania, South Dakota, Utah, Washington, West Virginia, Wisconsin, and Wyoming. Public-service jacks must be licensed in all these States except Kansas, New York, and Missouri. Nebraska had enrollment laws for many years but they have been repealed.

Licensed Sires Must Be Healthy

Since the passage of the original Wisconsin statute, changes have been made in various State enrollment laws. They vary considerably in their wording but all have the same intent, namely, the improvement of horse and mule stock through the improvement of public-service sires. One of the most common requirements for licensing such an animal is that stallions and jacks must be sound and free from hereditary and transmissible defects and diseases. To insure this, the sires are subjected to a thorough veterinary inspection before being licensed. Some States permit only purebred stallions and jacks to stand for service, while others allow grade and scrub sires to be used but insist that this information be clearly set forth on the license and on all advertising matter. As an indication that a stallion or jack is purebred, the owner is required to submit its registration and pedigree papers to the State license board. Only pedigree certificates issued by approved societies are acceptable for this purpose.

The State enrollment laws undoubtedly have had a great influence on the improvement of the horse and mule industry. One of the first and most far-reaching effects of the operation of the enrollment laws was the fact that they made available to the public valuable data hitherto unknown regarding sires used for breeding purposes. When the owner of a stallion or jack was required to state its breeding and to post the license at the breeding stand, owners of mares soon became familiar with various blood lines. Moreover, when the sires had served enough mares to make their worth or unfitness known, mare owners had a definite check on the relative merits of different individuals and lines of breeding. All this information has gradually worked for the betterment of the industry, for it has tended toward the elimination of inferior strains and has served to strengthen the position of the purebred sire over its grade and scrub competitors. These facts are evident from enrollment summaries of various States for a period of years. A large decrease has occurred in the total number of licensed public-service stallions and jacks, and the greatest proportion of this decline has been caused by the passing of the nondescript sire.

The passage of the early enrollment laws came shortly before an era of extensive horse and mule production. At that time it was a rather common practice for stallion owners to obtain their sires from abroad. This was particularly true in the breeding of draft horses, and

thousands of imported stallions came into the United States annually. Such importations were made primarily because there were not enough American-bred sires to fill the rising demand and because of the importance which was attached to the sire of foreign breeding.

Greater Percentage of Sires Are Purebred

The magnitude of stallion and jack enrollment in the United States when horse production had reached its heights is shown in a summary of the totals for the year 1915. In that year 18 States had enrollment laws and they had licensed a total of 55,553 stallions of which 59 per cent were purebred and 3,995 jacks of which 30 per cent were purebred. The stallions for five important draft breeds (Belgian, Clydesdale, French Draft, Percheron, and Shire) numbered 27,629.

Contrast these totals with those for the year 1928 when, after a prolonged period of decline, the number of licensed public-service sires in 22 States totaled but 15,775. Many of these sires were of high average age and were well past the period of greatest service. Of these sires 13,811 were stallions and 1,964 were jacks. Of the stallions enrolled 82 per cent were purebred and of the jacks 60 per cent. The 1928 stallion total was composed mostly of draft sires, 10,568 of which were purebreds of six different draft breeds.

The rise and fall of stallion and jack enrollment had a corresponding effect on horse and mule production in the United States. This production reached its greatest development between the years 1918 and 1926. Thus the high point came in the period marking the termination of the World War. The department's estimates of horses on farms in the United States on January 1, 1918, showed a total of 21,555,000 head. This is the greatest number in the history of our horse breeding, and the aggregate value was estimated at $2,246,970,000. Following 1918 horse population declined annually until on January 1, 1929, the total of horses on farms was estimated at 14,029,000 head, valued at $981,331,000. These animals were of high average age and were mostly well past the period of greatest usefulness. This depression in horse breeding was brought on principally because war-time operations induced a vast overproduction of horse stock. It also resulted because horse raisers, in view of the relatively low value of their animals, became uncertain regarding the future possibilities of their industry and stopped breeding operations, and because mechanical power had supplanted horses in many instances.

The production cycle for mules has not followed that of horses closely. In 1918 the estimated number of mules on farms in this country was 4,873,000. With the exception of the year 1925 this total was annually increased until in 1926 the high point was reached with 5,740,000 head. Subsequently there has been an annual decline in the number of mules, the total on January 1, 1929, being 5,447,000 head. The decrease in the number of mules, it will be noted, has been much less, proportionately, than that of horses. This may be attributed to the fact that the peak of the mule-production cycle is of rather recent date and because the demand for mules has not been greatly influenced by the substitution of mechanical power. The number of mules may be expected to decrease rather rapidly in the near future, however, unless breeding is quickly resumed. This is indicated by the fact that in the period of 1926–1928 the number of licensed jacks declined one-third.

Present Production Below Replacement Needs

The foregoing data on production and on stallion and jack enrollment indicate that our horse and mule industry has receded to the point where renewed breeding activity is needed to prevent the supply of these work animals from rapidly diminishing in the near future. This becomes especially apparent when it is realized that approximately 500,000 horse colts and 160,000 mule colts are now being raised annually where a million head of horses and 300,000 mules are required for replacements to keep the industry on its present footing.

A factor which may tend to stimulate this production is the fact that prices for both horses and mules have increased slightly during the last two years. Draft horses with size and quality are now in demand and they promise to bring good prices in the future. Among light horses the saddle mount and polo pony are increasing in popularity each year. Such horses are now commanding the highest prices in history. From present indications the mule situation should continue to improve. The demand for mules is greatest in the South and, inasmuch as this section yearly needs approximately the same number of work animals, and because the supply of mules is diminishing, the valuation should continue to rise.

S. R. Speelman,
Assistant Animal Husbandman, Bureau of Animal Industry.

INDEXES to Department Publications Must Meet Complex Requirements A book without an index has been compared to a locked chest without the key; with an index, or a key, the contents are readily accessible.

When the average reader picks up a reference work he expects to find an index in it. He takes that for granted almost as much as he does the numbers on the pages.

Many readers set a very high standard in index requirements. They want the index to be accurate, comprehensive but concise, well-arranged, easy to consult, sufficiently detailed, yet not too involved. They want it to suggest readily what answers the publication gives to the questions that occur to them naturally on the subject treated.

Thus the importance of reliable indexes is very great. Nevertheless, comparatively few people realize the expenditure of time and labor involved in making them. Neither do they appreciate fully the difficulty of good indexing. Both skill and special experience are required, and also an indefinite something called "index sense." An indexer must have considerable knowledge of the subject to be indexed; he must have a clear idea of the scope and general plan of the publication; and must exercise good judgment.

Indexes vary with the type of material concerned and the uses to which the material is to be put. Some are little more than expanded tables of contents; others may be exceedingly minute and may contain innumerable cross references. However, when cross-referenced too much, the whole index may be clouded. In short, the problem of indexing is complex.

The department started issuing printed indexes many years ago. That the work involved is considerable is evident from the fact that

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the department prints annually more than 1,700 separate bulletins, periodicals, and other publications.

Cumulative Indexes Issued

At present the department issues a title-page and table of contents for each 25 numbers of Farmers' Bulletins. Cumulative indexes to numbers 1–500, 1–1000, and 1001–1500 have been issued. A title-page and table of contents are issued for each 25 numbers of Technical Bulletins. As soon as 500 numbers have been published, a cumulative index will be printed. A title-page and table of contents have been issued for each 25 numbers of Department Bulletins but no cumulative indexes to this series have yet been published. An index to the series of 1,500 bulletins is now in course of preparation for publication.

A complete analytical index for all publications of the department from 1901 to 1925 (exclusive of periodicals, excepting the Journal of Agricultural Research and the Official Record) now being compiled, will be issued in book form. There are approximately 400,000 cards in this index. Successive shorter indexes will be issued in book form every five years.

In connection with this work, the department periodically issues lists of its publications. In 1927 a list entitled "Publications of the U. S. Department of Agriculture" from January, 1901, to December, 1925, was issued. This comprehensive work, compiled by comparing the titles with the originals, is of value as a separate publication and will be of particular service in connection with the 25-year cumulative index for the same period. Five-year lists will be issued for the periods subsequent to 1925. A 4-page pamphlet, issued monthly, contains brief descriptions of all the new department publications and revisions of older ones which appeared during the previous month. An annual list appears in the Yearbook and will this year be published as a separate.

MABEL G. HUNT,
Editor of Indexes, Office of Information.

INSECTICIDAL Properties of Fluorine Open Wide Field for Investigation In our continual warfare against ever increasing numbers of destructive insects, we can not afford to neglect any materials which seem to offer promise of assistance. Arsenical compounds have been one of the chief reliances of those engaged in combating such pests and still are one of the most effective insecticides. Organic chemical compounds and several plant extracts are also used extensively. Unfortunately, such compounds do not in all cases give satisfactory control, and some of them leave objectionable residue on foods intended for human and animal consumption. This renders necessary expensive and inconvenient methods of cleaning. Arsenical compounds are also objectionable on citrus fruits as the presence of arsenic seems to inhibit the production of the sugar and acid.

At present another class of compounds is being investigated which seem to have distinct advantages for some purposes, namely, the compounds of fluorine.

The discovery of the existence of the element fluorine was first recorded in 1670. Subsequent investigators tried for years to isolate it but without success. This feat was accomplished in 1886, however, by

the famous French chemist, Moissan, who prepared fluorine by electrolysis of a solution of potassium fluoride in liquid hydrogen fluoride.

Under atmospheric conditions fluorine is an almost colorless gas with a pungent odor resembling that of ozone. It can be liquefied at a temperature of $-187°$ C. It is probably the most active element known as it combines more or less easily with all other elements with the exception of nitrogen, chlorine, and some of the rare gases.

The element does not occur free in nature, but its compounds are widely distributed throughout the earth's crust in minerals such as fluorspar, cryolite, mica, and topaz, in rocks, and in hot waters from beneath the earth's surface, and they also occur in sea water, and mineral springs. It is an essential element for plant and animal growth. In man and animals it is present chiefly in the bones, teeth, blood, and milk.

Ample Supply of Fluorine

Commercially, large quantities of fluorine are available as a by-product in the manufacture of phosphate fertilizer. Phosphate rock contains, besides calcium phosphate, fluorspar or calcium fluoride and sand or silicon dioxide. When this mixture is heated with sulphuric acid, hydrofluoric acid is formed, which in turn reacts with the silica, forming gaseous silicon tetrafluoride, which is evolved. As this silicon tetrafluoride is very deleterious to plant and animal life, its diffusion into the atmosphere is prevented by passing the gases through water or solutions of other chemicals, in which it is absorbed. It has been estimated that every ton of phosphate rock contains approximately 60 pounds of fluorine, and as more than 3,000,000 tons of phosphate rock are sold or used annually in the United States, there is an ample supply of fluorine for insecticidal purposes.

Many Problems Still To Be Solved

There are many factors which govern the use of chemicals as insecticides. Among these may be mentioned cheapness, availability, ease and methods of application, toxicity to insects, plant tolerance, adhesiveness, undesirable residues left on plants and fruits and their possible harmful effects on man and animals, ease of removal of these residues, harmful accumulations in the soil when used on field crops over long periods of time, physical and chemical properties, and compatabilities with other insecticides.

As indicated, fluorine is available in very large quantities and for this reason compounds containing it should be relatively cheap. Present methods of spraying or dusting should also be applicable, as many of these compounds are relatively insoluble, finely divided powders with relatively low apparent densities. The toxicity to insects, of the fluorides and fluosilicates especially, has been under investigation for several years with excellent success reported in many cases. Plant tolerance is a factor upon which there seems to be considerable difference of opinion. Differences in climatic conditions in different parts of the country, as well as kinds of crops, rates and times of application, etc., would no doubt have very much influence in this respect. Considerable attention is being given to investigations of the fluorine compounds along these lines at the present time.

Unfortunately, many of these compounds possess physical and chemical properties which render them unsuitable for insecticidal uses.

Some are too soluble, others too insoluble, many are too heavy to dust well, some cause burning of foliage, and others are not sufficiently toxic to insects, but some have been found which give good control of certain insects without injuring the plants. There are many problems yet to be solved in the development of fluorine compounds as insecticides. As there are more than 500 known inorganic fluorine compounds and a much larger number of theoretically possible organic fluorides, the fields for investigation are unlimited.

Fluorine compounds have been used successfully as insecticides for a number of years as a protection against clothes moths, roaches, and chicken lice. They have been tested experimentally against several kinds of insects, such as the cotton boll weevil, codling moth, sugarcane borer, Mexican bean beetle, European corn borer, with results indicating that this group of materials is worthy of further investigation. It is believed that a satisfactory substitute for arsenic as a stomach poison to insects may be found among the fluorine compounds.

R. H. Carter,
Associate Chemist, Bureau of Chemistry and Soils.

JAPANESE Beetles Are Caught Plentifully in Geraniol-Baited Traps During the past several years traps have been used in increasing numbers for capturing Japanese beetles. The primary ingredient of the bait used to attract the beetles to the trap is geraniol, the attraction of which for the Japanese beetle was discovered at the Japanese beetle laboratory in 1923. The use of geraniol bait has made it possible to destroy thousands of beetles, and one trap has a record of having captured over 13,000 in one day.

As the trap which is recommended at the present time captures only one-third of the beetles that are attracted to it, large numbers accumulate in its vicinity, and cause more damage to plants by their feeding than when no trap is present. It is true that many beetles are caught, but the primary object of any Japanese beetle-control measure is to protect plants, and the trap defeats this end by increasing the degree of infestation. For this reason traps are not recommended at this time for use where protection of plants from injury by beetles is desired. Whenever traps are used, one of the poisonous sprays recommended for the control of beetles should be used also, so that the beetles which are not caught may eat the poisoned foliage.

It should be understood that this statement has relation to old and generally infested Japanese beetle areas where the use of traps on an individual property might, for the reasons indicated by the writer, even increase the beetle population and result in greater damage. On the other hand, the use of traps in isolated points of infestation where there is no risk of attracting beetles from the outside reduces the local beetle population by the number captured in the traps or collected near them, and thus may prevent an increase of or even greatly reduce the numbers of beetles for the succeeding year. Similarly, even in generally infested areas, where the use of traps can be made adequate on all properties over a considerable area, the destruction of beetles by this means may result in distinct benefit.

Use of Traps Is Popular

Regardless of the methods recommended for fighting the beetle, the use of traps will always be popular. During the past two years trap-

ping and killing beetles has appealed strongly to the popular fancy in the heavily infested area. There is something fascinating about seeing hundreds of beetles in the traps, and this has resulted in the employment of thousands of traps, especially in the suburbs of Philadelphia and Camden. On the other hand, several gardeners and caretakers on large estates have kept their traps in storage, after having found that it was more difficult to keep their plants free from the increasing number of beetles attracted by the geraniol bait. Except possibly for concerted or regional trapping, poisonous sprays are always better than traps for the property owner who wishes to protect his plants.

There are many types of traps on the market. A number of them have given satisfactory results, but some are of little value. Almost any trap of the funnel type, baited with the proper strength of geraniol, will attract and capture beetles. The United States Government standard trap, shown in Figures 109 and 110, is the best. Twenty-five thousand of these were used by the Plant Quarantine and Control Administration during the past year in its scouting work to determine the presence of beetles. The efficiency of the trap recommended last year has been increased. Advantage has been taken of the fact that beetles, after hitting an object while in flight, fall several inches, and a baffle has been placed directly above the funnel opening, as shown in the illustration. (Fig. 109.)

FIGURE 109.—The standard Japanese-beetle trap

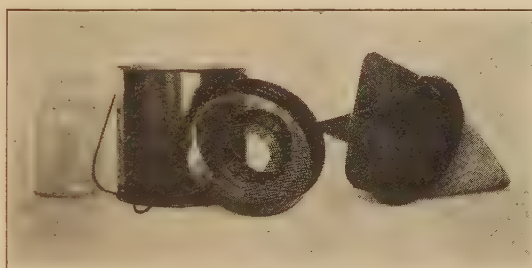

FIGURE 110.—The unassembled parts of the standard Japanese-beetle trap

FIGURE 111.—A mound of Japanese beetles containing 1,876 pounds, or approximately 10,000,000 beetles, caught in 500 traps during the summer of 1929

Traps Wrapped with Adhesive Paper

During the past year paper coated with an adhesive paste was wrapped around traps, thereby increasing the number of beetles that were killed. It is planned to recommend an adhesive substance for use with the standard trap. A great improvement was made by grinding a hole in the bottom of the glass container to permit the escape of water and gases.

Recent observations have shown that larger numbers of beetles per trap are caught when the number of traps in close proximity one to another is increased.

Five hundred traps were used on a 15-acre estate in a heavily infested area during July and August, 1929. From these traps 1,876 pounds, or approximately 10,000,000 beetles were taken. (Fig. 111.)

Further experimental work will be conducted to increase the efficiency of the standard trap, and to determine the value of large numbers of traps as a means of beetle control. Information on traps and bait, and their use in capturing Japanese beetles, is available in Circular 146 of the New Jersey State Department of Agriculture.

E. R. Van Leeuwen,
Associate Entomologist, Bureau of Entomology.

KITCHEN Improvement in Farm Home Promoted by Extension Service Large and increasing numbers of home makers are enrolled in the "better-kitchens" project that is carried on in many States through the Extension Service. It has been observed that if George Washington and his wife, Martha, should return to-day to a typical farm in this country, he would be at a loss to know how to use the farm machinery which inventive genius has produced in the past 150 years, but she could step into almost any farm kitchen and feel perfectly at home. She would find few outstanding differences in methods of cooking, baking, and dish washing. Many people are inclined to accept the situation as unalterable.

But the home-economics extension worker realizes that the farm home maker spends more than half of her waking hours in her kitchen in the preparation and clearing away of food, in washing, ironing, and cleaning. She knows that many a farm kitchen is far from efficient and she is meeting with gratifying success in her efforts to do something about it.

The problems facing the extension worker in her attempt to lighten the tasks of the farm home maker may be grouped under three heads:

(1) Many kitchens are poorly arranged, poorly lighted, and insufficiently equipped.

(2) There is a lack of money to make the larger improvements.

(3) Habit has kept many home makers from realizing that more system in the kitchen would release time and energy for other worth-while activities connected with the job of home making, such as child guidance and participation in community affairs.

To overcome these difficulties the "better-kitchens" work in several States has taken the form of a kitchen-improvement contest. Friendly rivalry is utilized as a stimulus to arouse home makers to make changes in order to save time, steps, and energy.

A kitchen score card is in use and the women entering the contest have their kitchens scored on such points as equipment and its arrangement, height of working surfaces, storage space, light, ventilation, and attractiveness.

Methods Used in the Contests

Various methods are employed in carrying on these contests. In some States each woman is required to submit a drawing of the floor plan of her kitchen before she is admitted to the contest. In Connecti-

cut, after drawing the floor plan, each woman uses the score card to score her own kitchen. She then makes another plan showing how she could improve the arrangement to insure greater convenience. The contest usually covers a period of three to six months to allow time for changes to be made. During this period, the extension worker visits the kitchens, if possible, and suggestions are made for improvement. The home makers are told at what height their sinks and tables should be for them. Group meetings are held, and newspapers, circular letters, and the radio are utilized to broadcast the whys and hows of better kitchens.

At the close of the contest the kitchens are rescored and judged, and the awards are made. Prizes are not offered for the finest, most beautiful, and convenient kitchens, because there is a small amount of money available for kitchen improvement in most farm homes. Rather the prizes are awarded on the basis of the greatest number of changes made for the benefit of the housewife and for sincere attempts to secure greater convenience and beauty in the home maker's work shop.

FIGURE 112.—Farm woman explaining changes made in her kitchen

The better-kitchen project reaches its climax when the tour is made to the prize-winning kitchens of the county. A letter of invitation is sent to a large mailing list of women. The men of the family are urged to come, too, for as one woman said, "They are the ones who help us make the changes."

The "kitchen tourists" assemble at the starting point. Banners are placed on each car. The cars form in line and follow the schedule worked out by the home demonstration agent. A printed program is given to each person making the tour. Kitchens to be visited are named and "changes to note" are listed with each kitchen. The most common changes are the following:

Sinks installed at correct height, with drain board at left.
Floors refinished and made easier to keep clean.
Walls and ceiling painted sunny cream color.
Dark window shades removed; new shades made of light colorful material which allows light to come through.
Furniture painted; attractive color scheme used.
Center light raised to ceiling, giving better light and eliminating shadows.
Table height corrected by use of casters.
Shelf placed over sink with hooks underneath shelf.
Equipment placed nearest the place where used most often.
Dish drainer acquired.
Kitchen stool in use.
Wood box on casters.

How Improvement is Effected

When the visitors enter her kitchen, each home maker enthusiastically explains the changes which have been made. She tells an interest-

ing story of how inconveniences endured for years, indeed entirely overlooked until viewed by the eyes of outsiders, have been eliminated. Steps between the kitchen and the dining room have been replaced by an incline in order that her serving wagon may operate. Dull rooms have been made gay with light paint and attractive window shades.

The hostess tells with pride of her husband's interest in her better kitchen and of his eager efforts to assist; how he has elevated back-breaking sinks, ranges, and tables, has reswung doors, put up shelves, and shifted the pump in order that her kitchen work may be made easier.

From Maine to California the women enrolled in the better-kitchens work are enthusiastic about the results. One says, "My kitchen is

FIGURE 113.—Corner of a farm kitchen showing sink and cupboard arrangement

now a joy to work in, pretty, easily kept clean, and a great satisfaction to me and my family." Another says: "How much easier it is to work in my newly arranged kitchen. Now I can make a cake, taking just half as many steps as were formerly required, all because of rearranging equipment and utensils."

Another reports: "The most delightful change in my kitchen is the color scheme. From a cold, dull room it has been transformed to a lovely sunny place that satisfies my desire for beauty. I have truly come 'out of the darkness into the light.' "

The touring visitors are impressed with the fact that women who have taken part in the contest, making changes in accordance with suggestions given, are saving themselves an average of 200 steps a day. They are impressed with the small cost of these changes, and find that a little money with a great deal of thought and some hard work have

produced wonderful results. The fact that the home maker herself, rather than the extension worker, tells the story of the changed kitchen is an effective bit of psychology. In telling the story the home maker increases her own self-confidence and commits herself to the practices she is discussing. The visitor listens to the account of changes made and thinks of it as the experience of a fellow worker. Seeing what has been accomplished, she is inspired to go and do likewise. The kitchen tour makes new friends for the Extension Service. Women become acquainted with that phase of the work, and they ask to have their kitchens studied and suggestions made for changes.

Slight Changes Effect Much

In making over these farm kitchens, in rearranging equipment, and in introducing color by means of bright paint and hangings, some of the changes made may seem trivial, but who can tell what a change was made in Mrs. Jones herself when the step between the kitchen and dining room was removed, allowing the use of a service wagon? Who can tell the light that was shed throughout the entire household of Mrs. Brown when a dark kitchen was made to gleam with extra windows and bright paint?

An Iowa woman describing her kitchen said:

> Dreams do come true! My remodeled kitchen is a reality. After 15 years of hoping and waiting and saving, my one year's kitchen study with the Extension Service showed me the possibilities of a convenient kitchen which would suit my needs and my pocketbook.

A Kansas woman said about her remodeled kitchen:

> You ask "Who helped do the work"? If you change that question to "Who did the work"? I can answer in two words "my husband." Perhaps I furnished the inspiration but he provided the man power and the brain power. We planned it entirely together, and he did the work in his spare time. The new conveniences shorten my hours in the kitchen, so I now have more time with my children and for many other things, namely flowers, reading, interior decoration, and friendly visits with my neighbors.

FLORENCE L. HALL,
Home Economist, Extension Service.

LABELS on Food Packages a Safe Guide to Buyer if Text Carefully Read Labels on packages of food products, while still vying with one another to attract the buyer's roving eye, now carry truthful statements as to the nature of the contents, thanks to a strict enforcement of the Federal food and drugs act for nearly a quarter of a century. And it is the hard cold facts set forth in these statements—not the appeal to one's sense of the esthetic made by the designs accompanying them—that permit a sound selection of one out of several cans, cartons, or bottles of any particular product. Not that these designs are misleading. The Federal food and drugs act forbids the use of misleading designs or devices just as emphatically as it does the use of untruthful statements about the character of the product described. Pictorial representations, however, can not tell the whole story.

Take, for instance, two No. 2 cans, both bearing attractive pictures of large red tomatoes, but labeled in one case "Tomatoes" and in the other "Tomatoes with Puree from Trimmings." As the can labeled

"Tomatoes" usually costs more than the other, it may be passed over as an extravagance. But let us look a little further. "Tomatoes" are tightly packed in the can, with no juice except that natural to them. The others are put up with a certain quantity of added liquid obtained from tomato trimmings. Both articles are wholesome but the use to which the tomatoes are to be put would seem to be the determining factor in the purchase.

Canned-Corn Labels

Canned-corn labels also have their little peculiarities. Maine packers for many years have prepared corn for canning by scraping it from the ears in a creamy mass, whereas some Maryland canners cut it off in such a way that the kernels remain more or less intact. Those who specially like a creamy corn, then, will buy "Maine corn," or "cream corn," the name given to corn put up by the same process in any of the other States. Corn canned by the Maryland method is labeled "whole-grain corn." Labels on canned corn, or any other canned vegetable for that matter, may state the variety packed, as "Country Gentleman" or "Golden Bantam" corn. The pure food law does not require that the variety be declared, merely that if declared it be a truthful declaration.

The word "stringless" on a can of beans does not necessarily specify a particular variety, but is used to define a high-grade pack of beans put up at a certain stage of growth before the "strings" develop.

The term "soaked dry beans" or "soaked dry peas," frequently appearing on cans of these widely used vegetables, is designed to spare the buyer any illusion that the can contains vegetables packed while young and succulent. "Soaked dry" vegetables are those that had become so mature and dry before canning that it was necessary to soak them.

And how about that little phrase "preserved with 0.1 per cent of sodium benzoate" or "contains 0.1 per cent of sodium benzoate" that once appeared on many cans and bottles of preserved fruits and vegetables and is still used to some extent? Owing to the restrictions which the food and drugs act places on the use of preservatives and to the natural prejudice of the consuming public against their presence in food, we encounter these declarations much less frequently nowadays than a few years ago. As refrigeration facilities and other approved methods for preventing decomposition are further developed, the use of preservatives will be even less prevalent. Manufacturers, however, still feel that a preservative is necessary for many fruit juices, sirups, and sodas and also for dried fruits. Sulphur dioxide is the preservative commonly used in dried fruits; sodium benzoate is the one for the other products. The presence of a preservative in any food product must always be declared on the label, making it possible for those having a distaste for artificial preservatives to shun them.

Labels on Bottled Beverages

The labels on bottled beverages, which until recently were most misleading, are now very generally truthful. Here we have three main classes: (1) True fruit products, either straight or somewhat diluted; (2) fruit-flavored products, the flavor being either true fruit

juice or pulp or an oil or extract made from the fruit; and (3) imitation-fruit products, the flavor of which is either entirely or predominantly synthetic.

Thus a bottle labeled "Grape Juice" will be found to contain straight fruit juice. Bottles labeled "Grapeade," "Grape Squash," "Grape Punch," "Grape Crush," or "Grape Smash" must contain a material percentage of grape juice with or without added water and sugar. Labels for such products may be garlanded with clusters of grapes or with grapevines. A "grape-flavored sirup" is labeled to show whether the flavor is derived directly from the grapes themselves or from an extract prepared without material chemical change from the fruit. The third general class, "imitation grape sirup," as the name implies, owes its flavor to a synthetic grape flavor instead of a true grape juice or true grape extract and its color is artificial. Even though it contains a small percentage of true grape extract, it must be plainly labeled "imitation." It is not entitled to any pictures of grapes and grapevines on its labels.

It is, of course, impossible to consider here the infinite variety of labels under which fruit and near-fruit beverages are offered to the public. A careful scrutiny of the label, however, should leave little doubt in the mind of the buyer as to whether a juice or a sirup is the real thing or a substitute. What has been said about beverages holds true also for hard candies and chewing gums, most of which are of the fruit flavored or imitation fruit variety.

Varied Designations for Salad Oils

Salad oils come under many and varied designations. Commanding a higher price and enjoying a wider popularity than the other vegetable oils, olive oil is always plainly labeled to show that it is the product of the olive and its labels are usually adorned with pictures of olive trees or groves or with Italian emblems of one sort or another. The presence of olive oil in mixtures, even though only in quantities large enough to add flavor, is invariably made known on the labels. Cottonseed, corn, peanut, and the other cheaper vegetable oils may be sold as "salad oil" or as "vegetable oil," the oil or oils present being mentioned or not according to the fancy of the packer.

The salmon packed in enormous quantities each year may be any one of five distinct species, each with certain characteristics that affect the texture and flavor of the fish in the can. The label, of course, does not attempt to give the scientific names of these species, but it usually gives the common names, which are as follows: (1) "Chinook," or "king," (2) "sockeye," "blueback," or "red," (3) "coho," "silver," "silversides," or "medium red," (4) "pink," (5) "keta" or "chum." The price and quality are in the order named. Spring-caught Chinook salmon from the Columbia River, deep pink and rich in oil, is generally considered to have the finest flavor and for that reason brings the highest price. Most dealers prefer Puget Sound red salmon to the red salmon from Alaska. Coho is lighter in color than red salmon and not quite so generally satisfactory in several other qualities. Pink salmon contains less oil and is rather soft, but its flavor appeals to many. Chum salmon is whitish and frequently is slightly less firm and has a low oil content.

"Sardine" is General Term

The term "sardine" does not, as many people seem to think, designate fish of a certain species, but is applied to any small fish of a very large family. The name is derived from the island of Sardinia, around which in the waters of the Mediterranean Sea abound the fish from which sardines in that region are made. Sardines are imported from Norway and France and are also put up in large quantities in California and along the New England coast, principally in Maine. The labels on these canned fish usually name the country or State of their origin and also mention the oil in which they were packed. Those packed in olive oil are more expensive than those packed in the other vegetable oils. Sometimes the name of the cheaper oil is given on the label, but usually only the words "packed in vegetable salad oil" or "packed in salad oil," without specifying the exact oil, are employed. These expressions signify cottonseed, corn, peanut, or some other vegetable oil. Mineral oils are not allowed in food products.

Labels also permit a clean-cut distinction between canned lobster and canned crawfish. The term "lobster" unqualified or accompanied by some geographic name, such as "cape" or "Pacific," denotes true lobster. The terms "spiny lobster" or "rock lobster," however, signify that the contents of the can are a species of crawfish, and the labels on which they appear may not bear pictures of lobsters.

Although truthful labels on food products are to-day the rule rather than the exception and can very generally be depended on to show the real character of the contents of bottle, can, or carton, some that violate the provisions of the Federal food and drugs act in one way or another are constantly cropping up. Steps under Federal or State pure food laws are at once taken to have these labels revised. Correcting them is only half the battle, however. To serve the purpose for which they are designed, they must be carefully and intelligently scrutinized by buyers.

KATHARINE A. SMITH,
Editor, Food, Drug, and Insecticide Administration.

LABELS on Veterinary Drug Preparations Should Be Studied Close scrutiny of the label on a commercial drug preparation to be used in combating any livestock or poultry disease may save farmers and ranchers some money and much trouble. The enforcement of the Federal food and drugs act and the insecticide act, in conjunction with the active cooperation of honest manufacturers, during the last few years has gone far in eliminating the worst frauds at one time prevalent in the sale of veterinary drug preparations, but much still remains to be done in this field. Whether strictly within the law or on the border line between fact and fancy, however, labels can serve as a very useful guide in reaching a wise decision in buying a medicine or insecticide for livestock, pets, or poultry.

In the first place, according to the consensus of present-day reliable veterinary medical opinion, there is no drug or mixture of drugs now known that can be regarded as an adequate treatment for contagious abortion of cattle, hog cholera, hog flu, fowl cholera, diarrhea of

chicks, coccidiosis, roup or diphtheria, gapes of chicks, chicken pox, blackhead of turkeys, distemper of dogs, black tongue and running fits of dogs, influenza, distemper, and heaves of horses. Obviously, then, buying any drug preparation sold for such ailments not only is a waste of good money, but, what is even more serious, gives rise to a false sense of security which may cause so long a delay in adopting proper preventive measures as to permit the disease to spread throughout the entire community. No honest and well-informed manufacturer will represent on his labels, in his circulars, or in his advertising that his preparations will prevent or cure any of the foregoing animal or poultry diseases.

Claims Made for "Worm Expellers"

The claims made for the so-called worm expellers also call for consideration before any buying is done. Critical tests by the Department of Agriculture have shown that many drugs reported in the dispensatories as having worm-expelling properties are not effective for this purpose. Manufacturers of such preparations have been warned to acquaint themselves with the latest developments in veterinary science and to refrain from making efficacy claims that have not been substantiated by critical tests by competent scientists. A product may be capable of expelling worms of one type, but no drug or mixture of drugs known to-day can be depended upon to act as an effective vermifuge against worms of all types that infest animals and poultry. The unqualified use of the term "worm expeller" or "vermifuge" in labeling these preparations, therefore, is a violation of the food and drugs act. The specific name of the worm or worms against which the preparation is known to be effective must be prominently set forth in the label.

And the same thing holds true for "mange cures." It has been definitely established that, although certain drugs are effective in the treatment of some types of mange, none yet known to science is an effective treatment for other types, including demodecic or follicular mange. Under the terms of the Federal food and drugs act the labels on these preparations must show clearly the type of mange or scabies against which they are known to be efficacious and under the terms of the insecticide act they must include the name and percentage of each inert ingredient or the name and percentage of each active ingredient and the total percentage of inert ingredients.

"Lice and Mite Killers"

"Lice and mite killers" also come under this category. Certain preparations recommended indiscriminately by their makers for the elimination of both lice and mites have been found by actual test to be effective against lice, but not against mites of any type. Others sold for use against lice in general have proved on examination to be capable of destroying lice of only one type, the biting type, not the blood-sucking type. Hence to meet the requirements of the law a label bearing claims for the elimination of mites or lice must be explicit as to the kind of mite or louse that will succumb to any particular application. A knowledge of which parasite is involved in any affection would seem a prerequisite to the intelligent selection of the remedial measure to be adopted.

Preparations which when administered to poultry internally would destroy all external parasites enjoyed a brief vogue in the rural sections of the country. Their doom was sealed, however, by a court case in which the jury returned a verdict sustaining the Government's contention that lice and mites would not be removed from poultry by adding to their drinking water a weak lime-sulphur solution.

Government officials maintain a constant surveillance over traffic in remedies for livestock and poultry to prevent frauds against the agricultural interests. Individual buyers, however, can greatly advance their own interests by carefully considering the labels on the remedies they propose buying before they hand their money across the counter.

H. E. Moskey,
Veterinarian, Food, Drug, and Insecticide Administration.

LAMBS Born Twins Are More Profitable than Singles, Figures Show Sheep raisers throughout the United States are depending more and more on the meat of the lambs produced, as a source of return from their flocks. This is true of the range sheepman as well as the farmer who keeps a small flock of sheep. The natural tendency of ewes of the English mutton breeds to produce a certain percentage of twins is quite a desirable trait to some producers while others maintain that single lambs are stronger, grow out faster, and can be marketed earlier and at greater weights. Sheepmen of the latter opinion are in favor of producing singles and often dispose of the weaker of a pair of twin lambs immediately in order that the other lamb may have the benefit of all the milk produced by the ewe.

Much may be said on either side of this question. Some ewes are not able to produce milk enough to develop twin lambs satisfactorily. If both lambs are left with such ewes both will be stunted and possibly be less valuable at marketable age than one of them would have been had it received all the ewe's milk. On the other hand, some ewes in the flock are almost sure to lose their lambs at lambing time or within a few days thereafter. Since these ewes will be in better condition for breeding the next fall if they raise lambs, the twins which are not doing well can in this way be divided.

Weights of Twin and Single Lambs

Even under the best of management the twin lambs do not look so plump nor develop so rapidly while young as do singles. However, after they are older and depend more on feed other than their mother's milk the twin lambs often develop quite rapidly and in some cases become larger than the average of the single lambs. (Fig. 114.)

Data compiled from the Government's purebred Southdown flock at Beltsville, Md., for the eight years from 1921 to 1928, inclusive, show that the average weight of twins at the ages of 3 and 6 months was less than the average for single lambs. The average of all single lambs at 6 months was 72.5 pounds, while the average of all twins was 63.4, or 9.1 pounds less. Yet the fact that lambs are usually raised largely on pasture and cheap feed and marketed before stored and harvested feeds must be used makes the advantage of 126.8 pounds live weight of lambs per ewe in the case of twins a considerable one when compared with the 72.5 pounds per ewe, for those producing singles.

If the single lambs would bring 15 cents a pound on the market, they would average $10.87 per ewe, whereas the twins even at 13 cents a pound would bring $16.48 per ewe, a difference of $5.61. This is more than 50 per cent greater return than from the production of single lambs.

Ewes with Twins Give Greater Net Returns

A pair of twin lambs, although smaller, will consume more feed than a larger single lamb. Figuring the annual maintenance of the ewe at $8 and the cost of feed and pasture at $3.60 per lamb, there would be a total cost of $11.60 associated with raising a single lamb, and $15.20 with raising a pair of twin lambs. Estimating the value of the fleece at $3 (7½ pounds at 40 cents) the ewes producing a single lamb would

FIGURE 114.—Lambs to the left of the hurdle were singles receiving all the milk produced by their dams. Those to the right were born twins and raised as such; that is, two lambs nursed one ewe. All were approximately 6 months old when photographed

produce a total return of $10.87 (value of lamb) plus $3 (value of fleece), or $13.87, from which the cost of $11.60 would leave $2.27 net profit. In the same manner, adding the fleece value of $3 to the value of the two twin lambs ($16.48) we get a total return of $19.48. Deducting the cost of production and maintenance ($15.20) leaves a net profit of $4.28. This figure is within 26 cents of being twice as much net profit per ewe as in the case of ewes raising only single lambs.

C. G. POTTS,
Animal Husbandman, Bureau of Animal Industry.

LAW Administration by Department Raises Some Unique Problems On every hand the officials of the department are confronted with questions of law or legal controversies. These matters are handled by a staff of lawyers. Many of the cases considered are unusual, while others might be regarded as routine, although most of the latter develop unique points of law or fact. The legal field of the department is very

broad. The case under consideration may involve the vindication of a Federal inspector or employee in the performance of his duties, the recovery of damages due to the destruction of Government property, the retention of lands which have been put to a public use, or one of many other situations which are constantly arising.

Federal grain inspectors sometimes discover a "plugged" car of grain presented for inspection under the United States grain standards act. This deceitful advantage taken of the purchasers of the grain may endanger the license of the inspector who graded the grain. A car is ordinarily plugged by placing an appreciable amount of distinctly low-grade grain in the bottom of the car to a depth of approximately 2 feet and covering it with grain of a much better quality. The probe of the inspector may be avoided by the location of the inferior grain, and the added precaution of heavily loading the car in such a way that even if the inspector probes at the proper place he will not reach the inferior grain unless suspicion prompts him to dig a trench in the top of the load, and probe to the bottom of the car.

Experience has demonstrated that the discovery of one plugged car is sufficient reason to identify all cars of the same shipper at the particular inspection point and to sample them with extreme diligence. Once the venture has been decided upon, a shipper usually executes his plan on a number of cars. A score of cars of grain, all efficiently plugged, shipped by the same concern to the same market, may be discovered by the Federal supervisor after the cars have been assigned a high grade by a licensed grain inspector. These inspectors are held to strict accountability and are responsible for the samples on which their grades are based. Under the department regulations, the grade of the entire car is based upon the plugged portion, which in itself may be a severe penalty on the shipper. When it is found that an inspector has misgraded a lot of grain, his fitness for the position which he holds is under scrutiny, and his license is suspended or revoked unless his failure properly to grade the grain is satisfactorily explained. Generally, in such cases, a hearing is held to determine the reasons for the incorrect inspection, at which the shipper is given an opportunity to explain the manner in which the cars were apparently loaded.

Prosecuted Officer Vindicated

Government officers or employees are often criticized as having been overzealous in discharging their duties. However, it is always well to await a determination of the facts before condemning the officer of having acted without authority, or maliciously. In the administration of its regulatory laws, the department meets many problems. Some of our national forests were infested with so-called wild horses to such an extent that it became necessary to take steps to protect forest forage and young growth. Regulations were promulgated providing for the impounding and disposition of such animals. Ranger Joseph T. Fears of the Apache National Forest, Ariz., was arrested and found guilty on a charge of maliciously killing an animal. This charge resulted from the ranger's having disposed, by shooting, of an unredeemed horse taken up and impounded in accordance with the department's regulations. The State court held that the defense that he acted under such regulations did not justify an acquittal on the ground that the regulations were contrary to the spirit of the Constitution and the laws of our

country. On appeal, however, the supreme court of the State reversed the lower court and ordered the ranger's discharge from custody, pointing out the evident truth that the ranger, having complied with the procedure prescribed by the regulations, could not be said to have acted maliciously.

Vast areas of land in the United States are reserved for national-forest purposes. Some of these lands are very valuable and are viewed with longing eyes by those who are not interested in the conservation of the national resources. While many of the public-land laws do not apply to these forest lands, they may be acquired under the mineral laws of the United States if of the required character. A prospective entryman may want the land for its timber value, or for the location of a gas station, or for its recreational value, but if his object be any of these, it must be concealed and he must base his entry upon the presence of a valuable mineral. The Little Beauty placer mining claim was located on the Tusayan National Forest, Ariz., by virtue of an alleged deposit of facial beauty clay. However, the entryman failed to convince the land department of the efficacy of the clay. It was held that the material was ordinary clay exhibiting no particular valuable properties.

Fire Hazard from Oil-Burning Engine

Can an oil-burning locomotive set fire to forests? The United States Department of Agriculture asserted that it could, and its view was upheld by the United States District Court for the Northern District of California in the case of United States *v.* Feather River Lumber Co., in which judgment in the amount of $41,575.80 was rendered. The action was based on a fire that occurred on the Plumas National Forest, Calif., alleged by the Government to have been caused by an oil-burning engine operated by the company. Oil-burning engines are used to minimize fire danger, and it was necessary to show that they are capable of setting fires.

Considerable difficulty was experienced in obtaining expert testimony in this particular because of the fact that those having expert knowledge are ordinarily railroad men who are reluctant to jeopardize their standing with railroad companies by testifying. Attempts to obtain favorable expert testimony on the subject in the East met with failure, the prevailing view being that the possibilities of such an occurrence were so remote that actual demonstration before the eyes would be required. This the department did not have. However, upon the evidence obtainable, the court held that an oil-burning engine is capable of starting a fire upon a right of way, especially when it is being sanded out with a resulting shower of sparks, carbon, and fire-box clinkers. The opinion is also of unusual interest in that the court held that the Government was entitled to recover for the damage arising out of the destruction of young growth on the basis of reforestation cost, and that the rule that the measure of damages is the difference in the market value of the land before and after fire is not applicable, since the national forests are not marketable. Upon appeal by the defendant, the decision below was affirmed by the higher court.

H. N. Foss,
Attorney, Office of the Solicitor.

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LAWNS Protected by Lead Arsenate from Beetle-Grub Injury The grubs of the Japanese and the Asiatic beetles live in the soil and feed normally on grass roots immediately below the surface. Throughout the areas of the United States where these beetles are found, they have caused severe damage to lawns. When there are only a few grubs feeding on the roots, the injury to grass may be so slight that the presence of the grubs is not suspected. When patches of dead grass are noticed within an infested area, a careful examination should be made to determine whether the injury was caused by grubs or by lack of water, poor soil, poor drainage, or disease. If caused by grubs, five or more grubs will be found feeding within a space of 1 square foot. The light areas in the lawn shown in Figure 115 are patches of grass which have been killed by grubs.

FIGURE 115.—A lawn injured by Japanese-beetle grubs

It has been found possible to protect both new and established lawns by treating the soil with lead arsenate. This chemical is a white, impalpable powder which is widely used in the control of leaf-feeding insects. It is poisonous to man when taken internally. Care should be taken not to inhale the powder, and the hands should be washed thoroughly after handling it. There is little danger to man or to animals after it has been applied to the soil.

When building a new lawn in the areas infested with these beetles, it is recommended that the land be prepared for seeding, then treated with lead arsenate at the rate of 35 pounds per 1,000 square feet of soil. The chemical may be sifted or broadcast by hand, or it may be applied by means of a fertilizer spreader. After the poison has been raked into the soil until it is uniformly mixed to a depth of 3 inches, the grass seed may be sown, and the land rolled and cared for in the usual manner.

Prompt Action Recommended

When injury by grubs begins to show in an established lawn, it should be treated at once. If a portion of the lawn has been killed, the dead grass should be dug, the soil poisoned, and the plot reseeded the same as when building a new lawn. The portion of the lawn where the grass has not been seriously injured should be top-dressed several times with a mixture of lead arsenate and soil, to build up gradually a poisoned layer at the surface. Use 5 pounds of lead arsenate and 1 bushel of moist soil for each 1,000 square feet of lawn to be treated, and mix as follows: Spread the soil about 3 inches deep on a cement floor or other hard surface, and spread the lead arsenate on top as shown in Figure 116. Turn the mass over with a shovel until the ingredients are thoroughly mixed, after which it may be broadcast by hand or applied with a fertilizer spreader.

The lead arsenate may be applied at any time during the growing season. New lawns are usually treated during early spring or early fall, just before the seed is sown. The top-dressings are usually applied at least twice during the growing season until a poisoned layer has been established.

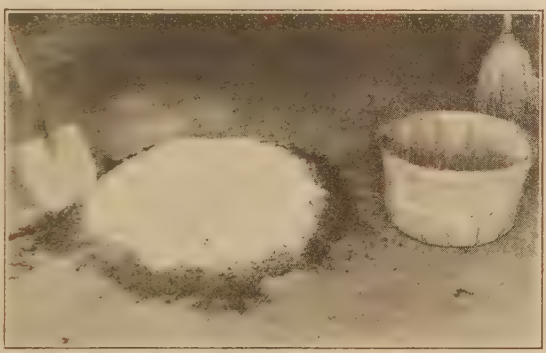

FIGURE 116.—One bushel of soil and 5 pounds of lead arsenate ready for mixing

Lawns which have been treated with lead arsenate should not be fertilized with sodium nitrate, potassium chloride, or potassium sulphate; but organic manures, ammonium sulphate, urea, cottonseed meal, and activated sludge may be used.

Lead-arsenate treatment of lawns in suburban districts is a practical method for controlling Japanese and Asiatic beetle grubs. Since the area of the average suburban lawn is less than 3,000 square feet, it would require less than 100 pounds of lead arsenate to poison the soil of a new lawn to a depth of 3 inches, and the cost should not exceed $15. This would protect the grass roots from injury by grubs for a period of four to five years. To top-dress an established lawn with lead arsenate and soil would cost proportionately less.

WALTER E. FLEMING,
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LEASED Farm Land in U. S. Two-fifths Greater in 1925 Than in 1900 It is costly for a man with limited funds to attempt farm ownership. Property in farm land gives low returns on the values involved as compared with property invested in the operation of a farm. With the same capital it is possible to operate a much bigger farm and do a much bigger business as a tenant than as an owner. Perhaps, in part, increased realization of facts such as these explains why it is that,

measured by the percentage of land in farms operated under lease, farm owners as a class have been losing ground.

The farm acreage operated under lease was two-fifths greater in 1925 than in 1900. During the same period the farm acreage operated by its owners decreased. Yet even in 1925 considerably more farm land was operated by its owners than was leased. But in six of the best agricultural States half or more of the land in farms in 1925 was farmed by persons who did not own it.

Land leased to farmers in 1925 was almost two-fifths of all land in farms in the 48 States. Nearly half of the crop acreage harvested was on this leased land. The figures given include acreages leased to part owners; that is, farmers who own some farm land and lease additional land. Included also are acreages operated by "croppers," who are laborers with a share interest in the crop, a class of tenants numerous in the South. The land farmed by tenants paying a share or cash rent is included.

Tenancy Increases Since 1900

Each census beginning with that taken in 1900 has shown the acreage operated by tenant farmers; that is, farmers who own none of the land in their farms. The percentage of all land in farms so operated has risen with every succeeding census; in 1900 it was 23.3 per cent; in 1910, 25.8 per cent; in 1920, 27.7 per cent; in 1925, 28.7 per cent. In 1925 tenants owning none of the land in their farms had over two-fifths, 40.6 per cent, of the entire acreage in harvested crops. The harvested crop acreage under lease was more than this by the amount under lease to part owners.

In 1900 the census showed the acreage operated by part owners. It was then 14.9 per cent of the acreage in farms. The relative importance of part-owner acreage has so risen that the corresponding percentage was 21.3 in 1925. The part owners of 1925 leased from other landowners 48.9 per cent of the acreage in their farms.

In six States, Montana, Wyoming, New Mexico, Arizona, Utah, and Nevada, part owners lease a greater acreage than tenants who own none of the land they farm.

Acreages Under Lease

Combining the acreages leased to tenants with that leased to part owners, it appears that approximately 30.6 per cent of all the acreage in farms was under lease in 1900, 33.4 per cent in 1910, spproximately 36.7 per cent in 1920, and 39.1 per cent in 1925. The six States in 1925 wherein the leased acreage in farms was equal to, or greater than, the acreage operated by its owners were Illinois, Oklahoma, Kansas, Iowa, South Dakota, and North Dakota. In 10 States less than a fifth of the land was farmed by persons who did not own it. The 10 States are West Virginia, Florida, Utah, Nevada, and the six New England States. In these States agriculture is of much less importance than in the six States first named. In Maine only 4 per cent of the land in farms is under lease; in Illinois the percentage is 55.

Comparing counties, and speaking in general, a high percentage of the land is under lease in counties having the best farming land. (Fig. 117.) East-central Illinois, for example, contains a large body of very valuable farming land on which two cash crops, corn and oats,

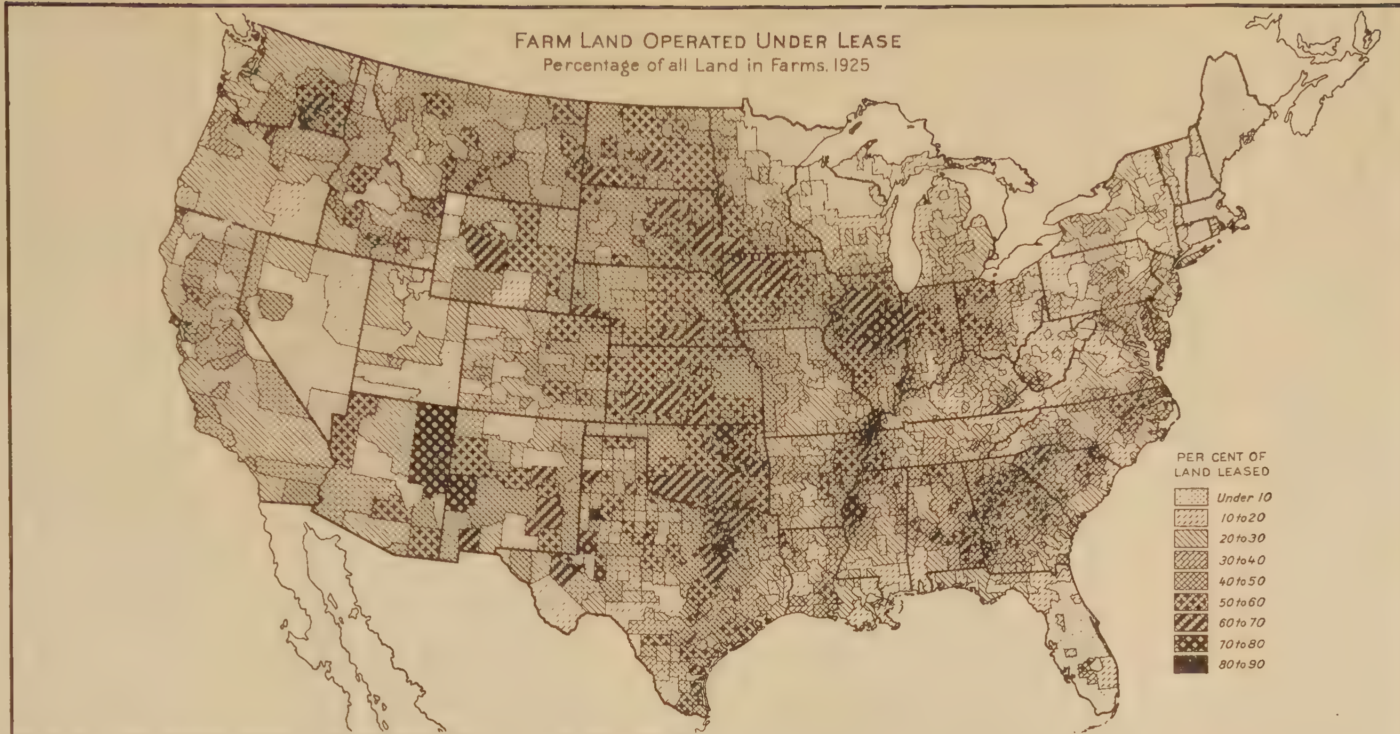

FIGURE 117. In the Corn Belt, in wheat-growing, and in many cotton-growing counties the amount of land under lease is high. It is particularly high in central Illinois and in northwestern Iowa, where land is very valuable. Where wheat is grown, it is high in the most productive parts, eastern North Dakota, western Kansas, and southeastern Washington. Where cotton is grown, it is high on the most fertile lands, the black prairies of Texas and Oklahoma, and the delta lands north of Vicksburg. The Western States have grazing counties in which much of the land in farms is leased. Of the 2,950 counties with at least 50,000 acres of land in farms only 6 had as much as 80 per cent of the land in farms under lease, only 44 had as much as 70 per cent, and only a fourth of the counties had as much as half

have for years been the dominant crops. In the heart of this corn-and-oats country is a block of counties in which over 70 per cent of the land in farms is under lease. Surrounding counties have less valuable land and less land under lease. Land values decline toward Kentucky and Lake Superior, with the land under lease less than 10 per cent of all land in farms in certain counties.

H. A. Turner,
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Bureau of Agricultural Economics.

LIGHT-WAVE Lengths Yield Information Important to Farmer The fact that the growth of plants constitutes a storing up of radiant energy from the sun in such a form that it becomes available for a variety of human needs has long been recognized. Within recent years very extensive studies have definitely shown that the flowering and fruiting as well as the vegetative growth of plants is greatly influenced by the relative length of day and night. In a qualitative way, two other variables of illumination have been studied, namely, the color of light and its intensity. It is common knowledge that plant stems and leaves grow differently in red light than in blue. Violet light greatly retards stem elongation, while plants grown in the longer wave lengths of the red region become elongated, weakened, and more succulent. Light intensity likewise plays an important rôle in the form and structure of leaves and other tissues. In view of this qualitative knowledge there appears to be a need for more elaborate experiments showing the quantitative relationship of light wave lengths (color) and intensity (brightness) to the various complicated processes of plant growth and metabolism, involving not only vegetative development, but also flower and seed formation.

Beyond this direct and immediately practical problem the effect of light enters into the farmer's existence in a great variety of other, and by no means unimportant, ways. It affects the health of his livestock, as well indeed as the health of his family and himself, providing an important part of protection against rickets and other diseases, including probably tuberculosis. It is required to activate the health-providing antirachitic vitamin, known as vitamin D, in order that it may have its beneficial action. It is one factor to be considered in the preparation and preservation of his commodities. The presence of light may, for instance, bring about the destruction of various essential oils which give flavor to fruits and vegetables.

Beyond the Visible Wave Lengths

Outside the region of visible wave lengths there exist light rays invisible to the eye. Beyond the red lies the region of the infra red and in the other directions beyond the blue to shorter wave lengths lies the region of the ultraviolet. While the existence of the former, largely through the heating effect it produces, which may be of therapeutic value, is recognized, the latter is often called sharply to our attention in other ways due to its particularly powerful chemical, or better, photochemical effects. It is chiefly the ultraviolet portion of the sunlight which produces sunburn. A considerable amount of ultraviolet

light invisible to the eye reaches us from the sun. It is interesting to note that the shortest wave lengths which leave the sun are absorbed in our upper atmosphere and that changing atmospheric conditions affect the amount of ultraviolet light which reaches the earth's surface. Certain wave lengths of ultraviolet light possess germicidal properties and it is for this reason that artificial sources, which yield a high intensity of light of short wave lengths, have been employed for sterilizing purposes.

From the above considerations it is evident also that harmful as well as beneficial effects may result from the action of short wave-length light and this makes even more important careful research in a field where careless procedure may lead to harm.

Finally, in a more indirect fashion, light wave lengths furnish information of value regarding the structure and behavior of molecules, of which both animate and inanimate matter is composed, and this is immediately related to the chemical changes which substances undergo under the influence of light. Further information on these subjects is of no greater importance anywhere to-day than in the fields of biology, that is to say, in the growth of plant and animal organisms. Just as the nature of a sound enables one to determine the type of instrument which gave rise to the sound, so the nature of the light, arising as it does in a fashion just as intricately dependent on the structure of the molecule as the sound is on the shape and the size of the instrument, gives us knowledge of the size, constitution, and behavior of these ultimate particles of which all matter is composed.

F. S. Brackett, *Senior Physicist,*
O. R. Wulf, *Associate Physical Chemist,*
Bureau of Chemistry and Soils.

LIVESTOCK Are Frequently Poisoned by Eating Paint and Other Forms of Lead

The Department of Agriculture frequently receives reports of lead poisoning in livestock, especially cattle. This kind of accident is not confined to any one section of the country or to any particular season of the year. In most instances the poisonous material to which the animals have had access is paint, although other forms of lead, such as red lead, sugar of lead, and litharge are poisonous and have caused death.

Paint is used very widely and most people are familiar with its poisonous nature. It is not so generally recognized, however, that livestock, especially cattle, are attracted by paint and will lick empty and discarded paint containers and even freshly painted surfaces. Carelessness in disposing of paint containers after the job of painting is done often results in giving livestock access to these objects and accidental poisoning may follow. Old paint cans, brushes, and other objects coated with paint should be discarded in places to which livestock do not have access. Animals should be kept away from freshly painted buildings, fences, and billboards until the paint is thoroughly dry. Even old paint is sometimes dangerous. There is a case on record in which cows were poisoned by licking a fence the paint on which had become old and flaky and was readily detached by the cows' tongues.

Two Forms of Poisoning—Acute and Chronic

Lead poisoning in livestock may take either of two forms, distinguished as chronic and acute. These differ mainly in the amount of lead material eaten by the animal and the symptoms subsequently exhibited by the victim. Acute poisoning, which is the more common form, follows the ingestion of relatively large quantities of lead. The symptoms are those of intense colic, grinding of the teeth, discharge of saliva, running from the nose, constipation, blindness, often convulsions, then coma and death. The breathing is more rapid than normal, the pulse is "thready," and the temperature little affected.

First-aid treatment in acute cases consists in giving a drench of Epsom salt, 4 to 8 ounces dissolved in a pint to a quart of water. Systematic treatment is technical in nature and should be given by a qualified veterinarian.

The chronic form of poisoning is less common and much more insidious. This form is produced by small and often minute quantities of lead ingested daily over a long period of time. Frequently lead poisoning is not suspected in these cases because the source of the poisonous material may not be at all obvious. Drinking water conveyed through lead pipes may dissolve enough of the metal to be poisonous. Cows have been known to be fatally poisoned by eating bullet "splashes," caused by lead bullets striking a hard object.

The symptoms of chronic lead poisoning are digestive disturbance, colic, alternated constipation and diarrhea, thirst, weakness from paralysis, emaciation, debility, stopping of rumination and lactation, sometimes convulsions, and finally coma and death. A very characteristic symptom is a blue line that appears on the gums. This is absent in acute poisoning. Treatment of chronic cases involves removal of the source of the poisonous material, doses of Epsom salt, and general supportive treatment. Potassium iodide is valuable in assisting elimination of the lead stored in the body. Here again, the treatment should be directed by a qualified veterinarian.

Cattle Are Most Susceptible

All classes of livestock are susceptible of poisoning by lead. Cattle are the most susceptible being poisoned by about one-tenth the dose required for the horse. In addition paint is especially attractive to cattle and this leads to a greater number of poisonings in cattle than in other animals. Sheep, pigs, and dogs are occasionally poisoned through lead, on the farm, but horses are rarely victims, perhaps on account of their relatively high tolerance of lead. Birds of all kinds may be poisoned with lead but under practical conditions rarely have access to lead compounds in a readily ingestible form.

JAMES F. COUCH,
Associate Chemist, Bureau of Animal Industry.

LIVESTOCK Diseases Are Studied by Experiment Station at Bethesda, Md.

The control and eradication of livestock diseases are well known to be a major activity of the Bureau of Animal Industry, and much of the painstaking research necessary in solving disease problems is performed at the bureau's experiment station, at Bethesda,

Md., 5 miles north of Washington, D. C. The work is largely of pathological and veterinary character in contrast to that of other Federal stations and farms which deal with livestock and crop problems largely from a production standpoint.

Thousands of Animals Are Used in Experiments

The experiment station's activities consist of independent investigations and also cooperation with other scientific divisions of the bureau in the work necessary for combating the numerous infectious maladies which beset the country's livestock. As many as a dozen diseases may be under investigation at the station at one time. The work therefore calls for an adequate scientific staff as well as a well-trained force of attendants to care for the experimental animals. The scientific staff, of course, plans and directs the experiments and interprets the results.

FIGURE 118.—The small stables shown in the foreground are used for experimental animals which need to be isolated from one another. The double line of fencing prevents animals in adjacent pens from coming into contact with one another

Some of the investigations involve a complexity of problems and a number of unknown factors, so that several years must elapse before results can be accurately interpreted. In such cases long series of observations and tests are necessary, requiring the use of hundreds and even thousands of small experimental animals for inoculation purposes.

Special Equipment Needed for Investigations

The experiment station comprises 50 acres, which are used mostly for fields, pens, laboratories, and other buildings. (Fig. 118.) A small amount of land is kept under intensive cultivation to provide green feed for the experimental animals.

Some of the buildings are necessarily of a temporary nature, because new problems require rearrangement of pens, stables, and other equipment. But many are more or less permanent, such as a fireproof administration building, equipped for pathological and bacteriological work: a small laboratory used in the investigation of

poultry diseases; the superintendent's residence; a large breeding house for small experimental animals, where about 10,000 guinea pigs as well as many rabbits and white rats are raised annually; houses for small animals that are used in the experiments; a post-mortem room; and stables for large animals.

In the investigation of diseases that are easily transmitted, special arrangements are provided to prevent infection from being carried by drainage or on the feet of attendants. The pens and floors are elevated above the ground level, and basins containing disinfectants are provided through which attendants must walk on entering or leaving. Some of the structures are screened against birds. Pens containing animals affected with diseases that might be carried by insects are also screened. (Fig. 119.) Sometimes it is necessary for attendants and investigators to wear rubber boots and clothing while near the infected animals, so that infection will not be carried on their persons.

FIGURE 119.—Experiment pens used for hogs, sheep, and chickens. Note the two layers of woven wire, one to restrain the animals and the other to exclude birds. The floor, made of a single slab of concrete, makes frequent disinfection relatively simple

The station has its own water system, consisting of two deep wells, electric and gasoline pumps, storage tanks, and pipes extending to every field and inclosure. It is provided with city gas for heating incubators and for other laboratory uses, and with electric current for power and lighting. An incinerator disposes of animal carcasses and other infectious material.

Some Outstanding Results of Station Work

The work at the station played an important part in the epoch-making discovery by Theobald Smith of the cause of tick fever. The station helped also in making tick eradication possible, in working out the relation of human to bovine tuberculosis, and in the earlier hog-cholera investigations.

Several times the station has aided in the determination of foot-and-mouth disease outbreaks. It has also made important discoveries in connection with a disease which so nearly resembles foot-and-mouth disease in appearance as to be a very confusing factor in its diagnosis. Its investigations of infectious abortion, which have been conducted for about 20 years, have led to the discovery of fundamental facts concerning the nature of that disease and its control.

For a third of a century the station was under the direction of the late Ernest C. Schroeder, who was superintendent from 1894 until his death in 1928. During that period the work of the station developed to a high state of efficiency and gained world-wide recognition.

Persons interested in animal diseases, especially those who have to deal with the particular diseases under investigation, can often gain

helpful information by a visit to the station. However, since many of the experimental animals are kept under what amounts to quarantine conditions, arrangements must be made so that such persons are accompanied by an employee familiar with the various experiments.

W. E. Cotton,
Superintendent,
J. M. Buck,
Assistant Superintendent,
Bureau of Animal Industry Experiment Station.

LIVESTOCK Grades and Meat Grades Are Now Closely Correlated A meat animal possesses no points of excellence which are not inherent in the carcass and which can not be appraised by the meat dealer or meat consumer. The animal is bred, fed, raised, and slaughtered to produce something the meat consumer wants and for which he will pay a good price.

Figure 120.—Choice grade slaughter steer and Choice grade steer carcass

Hence, there must be a very close relationship between grades for livestock and grades for meat; in fact, the grade of the animal must be the same as that of its carcass. The standard for a given grade, therefore, must be the same whether the animal is graded alive or dead, on the hoof or on the hooks.

Until recently, however, both the livestock and the meat industries largely ignored this important fact. Livestock producers set up certain standards or ideals which embodied their own preferences or which they considered best suited to their economic circumstances, without giving much consideration to the meat industry because the latter always bought at some price all the livestock produced. If the price was unsatisfactory to the producer he usually charged that fact up either to his hard luck or to the greed of the buyer. Even at the great livestock shows the animals were judged by comparing one with another instead of matching the animals with the carcasses they would produce and matching those carcasses with consumer demands.

The meat industry exercised a similar independence. The consumer demanded the kinds, classes, weights, and grades of meat which best suited his taste or pocketbook and insisted that the stockman either supply that kind or accept a lowered and unprofitable price.

Then came lean years, years made up of high production costs and low selling prices, and the stockman was forced to cast about for the basic causes of his distress and for any possible remedies. About this time the Department of Agriculture began to develop its livestock and meat standardization program. One of the fundamental principles of this program was the proposition that in slaughter animals the grade standards must be the same for the live animal and for its carcass. Once enunciated, this principle was readily accepted by the more forward-looking members of both the livestock and meat industries, with the result that a relatively high degree of cooperation between the activities of the two is now in evidence.

Standards Based on Three Factors

Live animal grading is nothing more nor less than an antemortem grading of a carcass. The standards used by the department, whether for live animals or for dressed meat carcasses, are based upon three factors—conformation, finish, and quality. To grade Choice, a lightweight yearling steer must possess certain conformation. In other words, the round, the loin, the shoulders, and all other portions of the animal's anatomy must be developed in a certain way or to a certain degree. It must also possess a certain degree of finish, that is, the fat must be of a certain thickness on different parts of the body and must be of a certain character. Then the animal must possess a certain degree of quality.

When the carcass is graded the same requirements must be met. If the carcass is to be graded Choice the conformation, the finish and the quality must be the same as required in the live animal. As a matter of fact, the standards set up for the live animal were really carcass standards, because it was the carcass at which the work was aimed from the beginning. When considered from this viewpoint it is obvious that the live animal grading was merely an effort to look under the skin and visualize the carcass while the animal was still alive.

There still remains the problem of maintaining this identity of standards in actual practice—to guarantee that an animal which grades Choice on foot will produce a Choice grade carcass on the hooks. This is the stumbling block which, to many, seems insurmountable.

On the great livestock markets hundreds of men are paid good salaries solely because of their skill and ability in determining in advance what is under the hide of a meat animal. Department workers are constantly grading both live animals and meat carcasses, and the record of their performances shows conclusively that it is wholly practicable to require a definite correspondence between the grade of the animal and its carcass.

Recently the department has cooperated with 21 State experiment stations in a study [9] involving the grading of more than 2,000 cattle

[9] The national cooperative project, A Study of the Factors Which Influence the Quality and Palatability of Meat. This study was conducted by the Bureaus of Agricultural Economics, Animal Industry, and Home Economics of the United States Department of Agriculture and the experiment stations in the following States: Arkansas, Colorado, Indiana, Illinois, Iowa, Kansas, Louisiana, Michigan, Mississippi, Missouri, Montana, Nebraska, New Mexico, North Carolina, Ohio, South Carolina, Texas, Virginia, West Virginia, Wisconsin and Wyoming.

and their carcasses. Although the department's official standards provide for only seven grades, in this study each grade was divided into three thirds, which called for much greater refinement in the grading. It was found that over one-third of the 2,000 carcasses were placed in the same third of a grade as had been the live animals from which the respective carcasses were derived. In approximately one-half of them the difference between live and dressed grading was only one-third of a grade, and in about 15 per cent it was two-thirds of a grade. In other words, approximately 96 per cent of the carcasses were placed within the same grade as had been the live animals which produced them. Those who graded the carcasses had no knowledge as to what grade had been placed on the animal. Thus a very high degree of correlation between the application of livestock grade standards and meat grade standards was demonstrated.

C. E. Gibbons,
Senior Marketing Specialist.
L. B. Burk,
Agricultural Economist,
Bureau of Agricultural Economics.

LIVESTOCK Malady Known as Infectious Abortion is Intensively Studied Public discussions of abortion disease continue to show that livestock owners regard it as the arch enemy of domestic animals in the United States. Its ravages, especially among cattle, have become conspicuous in recent years by reason of the gradual suppression of tuberculosis and other diseases for which effective eradication and control methods are already known.

As reported in the Yearbook of Agriculture, 1928, the Department of Agriculture is endeavoring to find improved means of suppressing infectious abortion through a comprehensive program of laboratory research and experimentation on farms. Eight State universities or experiment stations are now cooperating in this work. The studies are highly technical, yet it is desirable for stock owners to be familiar with the broad scope and nature of the work and with the encouraging progress made during the last year.

Scope of Cooperative Work

The investigations in which State institutions are cooperating include the following subjects:

California. The veterinary department is studying the problem of immunity, carriers of the disease, and the relative productivity of infected and noninfected dairy cows on the same farms. The animal-husbandry department is conducting a project on nutritional deficiencies and abortion in beef cattle on the range.

Maryland. The abortion project comprises (1) a herd survey of reacting animals to determine the relation between the reactions to the abortion test and udder infection, and (2) determining the best methods of limiting infection and reducing exposure in infected herds when more drastic means of control are not practicable.

Michigan. The work in this State includes (1) the use of abortion germs, freed of virulent properties, as an immunizing agent, and (2) bacteriological studies of the organism.

Minnesota. The project here deals with the standardization of blood tests in combating the disease.

New York. The work in this State deals with eliminating abortion by blood testing and segregation of reactors.

Oregon. The project here includes (1) studies of cattle that have given certain types of reactions to agglutination tests, and (2) the effect of reinfections among cows that reacted to the disease.

Wisconsin. In this State the study involves (1) the use of chemical agents as a possible means of dealing with the disease, and (2) breeding experiments with rabbits resistant to abortion.

Independent Federal Investigations

In addition to cooperating in the work just outlined, the United States Department of Agriculture is conducting independent investigations. This work deals, in a general way, with artificial immunization, methods of diagnosis and their interpretation, various methods of control and eradication, modes of infection, and relation of swine and bovine abortion. One endeavor is to develop a vaccine that will be effective and at the same time not become established in the udder. The discovery that the abortion organism has a human-health significance makes it more than ever desirable that methods of vaccination do not cause udder infection. This work involves the use of large numbers of experimental animals, frequent blood and milk tests, controlling exposure to the disease, and innumerable details, all of which are time consuming.

The presence of the swine type of abortion organism in the udders of cows is likewise under investigation owing to the belief that this type of organism is more infectious for man than the bovine type usually found in cattle.

Calfhood Vaccination Is Promising

Investigations as to the possibilities of vaccination during calfhood are yielding results of interest, though they are not yet conclusive. Of 11 vaccinated animals, 10 have successfully passed through two periods of pregnancy during each of which they received exposure to infection of such severity that 50 per cent of the control animals aborted. The results thus far indicate that calves may be vaccinated with relatively little danger of becoming permanently infected.

Another group of calves has been vaccinated at a somewhat earlier age. This system, if successful, would have the advantage that even if the vaccine infected permanently an occasional animal, it could be detected before reaching breeding age.

Owing to the great importance of diagnosing infectious abortion accurately, the department's investigators have made many thousands of blood tests on animals over which it has control in its own herds and in others under observation. This work has resulted in voluminous data on the accuracy and also the limitations of the agglutination test and its interpretation.

Other data recently obtained have indicated that the introduction of the organism into the skin infects more readily than when introduced under it. This feature is being investigated to determine whether slight scratches or injuries to the skin may be a means by which the disease can be communicated.

Even though some of the experiments may fail to bear the fruit hoped for, every fact that can be revealed is a step of progress. Pending the results of the experimental work outlined, livestock owners may aid in keeping losses from infectious abortion at a minimum by utilizing the knowledge already available. Various practical methods of excluding infection from herds and premises and of dealing with the disease, when already present, are discussed in Farmers' Bulletin 1536–F, which may be obtained on request.

Consult Dependable Sources for Information

Livestock owners are cautioned against placing dependence on alluring claims for medicinal cures or remedies for abortion. Money spent for such products is likely to be wasted, not to mention possible injury that may be done to livestock. It is also unwise to draw general conclusions from limited observations on a few aborting animals. Studies of the disease, to justify sound conclusions, must be made under carefully controlled conditions with ample numbers of livestock. The wise and safe course in dealing with infectious abortion is to consult a competent, trained veterinarian or to request the latest publications and other information from State agricultural experiment stations or the Department of Agriculture.

J. R. Mohler,
Chief, Bureau of Animal Industry.

LIVESTOCK Production Estimating by States is Complicated Task For many years the Division of Crop and Livestock Estimates has issued annual estimates of the amount and value of crop production, by States, but only during the last three years have similar State estimates been undertaken for the principal meat animals—cattle, hogs, and sheep.

Because of the marked difference in the methods of production between livestock and crops, estimating the amount of livestock production each year by States is a much more complicated procedure than estimating the amount of crop production. Crops are largely raised in definite yearly quantities, determined by multiplying the estimated acreage by the estimated yield per acre, and production is in terms of fairly uniform units, as bushels, bales, or tons. Crops are produced entirely within the locality in which the acreage is located.

Livestock production is not in definite yearly amounts but results from the addition to numbers due to births and increase in weight due to growth of young animals toward maturity. Only a fraction of the animals born reach maturity, since many are disposed of at different ages and different sizes, with no uniformity either in these ages or sizes or in the proportions disposed of from year to year. Livestock production is not completed within the locality in which the animals are born, for there is an extensive movement of unfinished animals out of some States into others to be grown out or finished. The weight added to these animals is considered as livestock production.

In the methods worked out for determining the yearly amount of livestock production by States there are three distinct operations. The first is concerned with inventories. The number of each species, as estimated at the beginning and end of each year, is separated into

different significant age and sex groups. The average weight per head of each of these groups is estimated, and the sum of the total weight of each group gives the total inventory weights at the beginning and end of the year. The difference between these total weights is the difference in inventory. Although differences in feed supplies, weather conditions and other factors from year to year result in differences in average weights of different classes of each species at the end of each year, such differences are not included in the estimated average weights per head of different classes—these averages are taken as constant from year to year.

Determining Increase or Decrease

The next operation is to determine the items of increase and decrease responsible for the changes in inventory numbers during the year. This is shown in the form of State balance sheets which give for each species, on the debit side, the number on hand at the beginning of year, number of young animals born (or saved), and number shipped into the State. On the credit side are shown the number shipped to markets, the number sold locally for slaughter, the number slaughtered on farms, and the number that died. The sum of the credits, subtracted from the sum of the debits, gives the number at the end of the year.

The third operation is to convert the items in these balance sheets that are factors in determining the amount of production, into pounds, by multiplying the number of head by an estimated average weight per head. These total weights are then combined to arrive at the total production. The method of combining these is as follows: The total weight of animals shipped, sold for local slaughter, and slaughtered on farms, which gives the amount disposed of during the year, is obtained; from this total is subtracted the total weight of animals shipped into the State during the year; this difference is then either increased or decreased by the change in inventory weights according as the inventory increased or decreased. This final amount is the total production in pounds.

This total production is evaluated by multiplying the weight produced by the weighted average farm price per pound. This weighted farm price is obtained by weighting the monthly farm prices by each month's proportion of the total yearly marketings. The inventories at the beginning and end of the year are not evaluated; hence changes in inventory values due to change in unit values are not included in value of production. The animals shipped into the State are not evaluated at an average cost; only the increase in weight of these is evaluated, not separately, but as a part of the total production. Animals that die are not considered as animals produced. In the production figures no consideration is given to young animals that die within the year in which they were born; animals that were in the beginning-of-the-year inventory, and that die during the year, are included in the previous year's production but are deducted from that of the following year. The inclusion and deduction, however, are made in the balance sheets and not in the actual production figures.

Methods Different for Cattle, Hogs, and Sheep

Among the three principal kinds of livestock there is some difference in methods. Because of the big difference both in weight and price be-

tween cattle and calves, and the large number of calves slaughtered in the year when born, the weights and values of calves disposed of are computed separately from those of cattle. The separation between sheep and lambs is carried further. Large numbers of lambs born in one year are put on feed for market and carried into the following year, and are sold for slaughter, as lambs, in that year. Hence, it is desirable to make separate estimates of the amount and value of production of sheep and of lambs, taking into consideration changes in the inventory of lambs in computing the lamb figures. Because of the comparatively narrow price range on hogs of all ages, it is not necessary to separate pigs from other hogs.

Prices used in these estimates come from price reporters who give the average price paid in their localities. These are largely prices paid for animals for slaughter or for shipment to markets; hence they are values for meat purposes. They do not include value for other purposes, such as the milking value of dairy cattle or the breeding value of purebred livestock of all species. Hence these estimates are to be considered as representing largely the amount of livestock produced in pounds and the value of this production at meat-animal prices.

Information used in preparing these estimates is obtained from various sources. For many States rather complete information is available showing shipments to market or out of the State, and into the State; farm slaughter is estimated from census and sample data; information as to local slaughter is inadequate and these figures are largely estimates; average weights are based upon sample data, market records, census slaughter reports, and informed opinions; numbers of young animals born (or saved) and death losses are estimated from reports from a large number of farms and ranches giving these items for their own production and from farm and ranch management surveys.

Because of the lack of definite information as to some of the factors used in making these estimates and the great difficulty (amounting almost to impossibility) of getting fairly exact information as to some of them, these estimates are only approximations. Hence they can be considered as being more exact in showing relative changes in the amounts and value of production from year to year, than in giving absolute figures for any year.

C. L. Harlan,
Senior Agricultural Statistician,
Bureau of Agricultural Economics.

LIVESTOCK Profits Grow Following Adoption of County Agents' Counsel Almost daily, county agricultural agents are asked how to increase livestock profits. Their practical suggestions for more profitable livestock management have included better breeding to improve quality of livestock, more intelligent and economical feeding, the control or elimination of livestock diseases, and proper fitting and grading to meet the market demands and obtain the highest prices for the product.

A herd-improvement association member in Stephenson County, Ill., who adopted recommendations for a change from ear corn as the only grain feed to a balanced ration increased his net returns on the herd above feed cost from $112 one month to $181 the following month. A

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member in another Illinois herd-improvement association after weeding out half of his herd as unprofitable and feeding the remaining cows better rations increased the returns per dollar spent for feed from $1.61 to $2 and reduced the cost of producing butterfat from 40 cents to 24 cents per pound.

Culling out the poor producers and introducing selected purebred sires have increased the average production of daughters over dams in many herds as much as 100 pounds of butterfat. The influence of the improvement in the productiveness of cows has been exceptionally large in Minnesota. The census reports show that during the five years from 1920 to 1924 there was an increase in milk production in the State of 40 per cent with only a 12 per cent increase in the number of cows.

Dairy Herd Feeding Costs Reduced

Reports of 1,320 dairy-herd-improvement associations which are maintained in counties with the assistance of county agricultural agents indicate that the cost of feeding dairy cows has been reduced in many herds as much as 10 cents a cow per day with no decrease in milk production. Doubling the carrying capacity of pastures through the use of sweetclover has materially reduced the outlay for commercial feeds. One farmer near Plum City, Wis., reported that a 20-acre pasture of sweetclover took care of 35 head of cattle, 35 hogs, and 5 horses from May 20 to September 1.

The average yearly butterfat production in more than 2,000 herds in Iowa cooperating in dairy-herd-improvement work was 275 pounds, while the average for the State was only 175 pounds per cow. The average feed cost per pound of butterfat was 22 cents in cooperating herds compared with 38 cents per pound for the whole State. Improved management has doubled and even quadrupled the average profit per cow in many herds where farmers have adopted better methods in dairying.

The quality of dairy products has been improved through increased sanitation and better methods of handling milk before it reaches the creamery, the cheese factory, or the shipping station. This improvement in quality has helped to increase the demand for dairy products, and increased consumption has helped to maintain prices. Tuberculin testing of dairy cows has been encouraged. This has resulted in eliminating from the dairy herds of this country on the average more than 250,000 reacting dairy cows a year during the past five years. Nearly 100,000 additional cows were culled out each year through the records of the herd-improvement associations. Both of these methods of culling have reduced production costs.

County agents have also been active in getting all farmers in their counties to have their cows tuberculin tested in order to place the counties on an accredited-area basis. The 10 cents per 100 pounds premium paid by packers for hogs from accredited areas has increased returns to farmers by more than $10,000 in a single county. This premium money returned to the hog raisers in accredited areas in the United States is more than $600,000 annually.

Hog Losses and Production Costs Reduced

In swine production, the sanitation and other improved practices recommended have in many instances reduced the time necessary to

produce a 220-pound hog from 9 or 10 months to 6 or 7 months. Adoption of sanitation methods has also materially reduced the losses of pigs from disease. The average feed and labor cost for the litter is therefore greatly reduced and the net profits are increased accordingly.

Reports from 39 county agricultural agents of Illinois showed that the average number of runty pigs was reduced from 1 in 8 under the old plan of raising hogs to 1 in 86 under sanitary methods. The 314 cooperating farmers reported an average saving of $16.20 per litter in the cost of producing pork.

On one farm in Green Lake County, Wis., where sanitary methods were not followed in 1926, 9 sows farrowed 60 pigs, 4 of which were lost due to roundworms. The remaining 56 averaged only 180 pounds at 11 months of age. In 1928 on the same farm under sanitary conditions, 8 sows farrowed 62 pigs; no losses occurred during the growing period; and the 62 pigs averaged 212 pounds each at 6 months of age.

FIGURE 121.—These two hogs are the same age. The large hog at left was raised on clean ground while the runt at right lived on the worm-infested old hog lot and never grew up

Iowa county agents reported 34,000 hogs raised in hog-lot sanitation demonstrations carried on in cooperation with the county agricultural agents during 1928.

More Wool per Fleece and a Better Price

Better methods in shearing, grading, tying, and sacking wool often result in an increase in its market value of 5 or 10 cents per pound in comparison with wool improperly handled and prepared for market. Many extension agents reported that culling ewes and using selected rams has increased the average weight of fleece 2 pounds per head in some flocks.

The county agent in Lake County, Oreg., reported a sheep-culling demonstration which has extended over a period of six years. Light-shearing ewes were culled out at shearing time and heavy-shearing rams were used, with a resulting increase in average fleece weight of 1.5 pounds during the first five years.

More Eggs and Profits from One-Fourth Less Hens

Many poultry cooperators who have adopted the sanitation, culling, feeding, and management practices recommended have been able to double both the egg production and profits received by average farmers.

One-fourth of the flock has frequently been culled out as poor layers without reducing the total number of eggs gathered daily. This has resulted in a considerable saving in feed. Reports from 264 Illinois poultry record flock cooperators showed that the one-third who received the best returns obtained an average profit per hen of $2.85,

while the least successful one-third of the record flock cooperators made only 16 cents per hen. The improved breeding, feeding, sanitation, and management methods in the flocks of the more successful cooperators made the difference.

Early Gains Make Largest Profit

County agents and extension specialists have continued to acquaint livestock producers with the fact that early gains in weight of livestock, including poultry, are put on at the lowest cost and usually at the largest net returns to producers for feed and labor expended.

Twenty-two Indiana farmers, cooperating in calf-raising demonstrations in which accurate accounts were kept of costs, raised 105 beef calves from 113 cows. These calves, which were conservatively appraised at $48.59 each, were produced at an average cost for feed of $29.16. The cost of feed per pound of gain for 2 year old and 3 year old steers is 25 to 50 per cent more than for calves and yearlings. Lower feed costs and improved quality and price of baby beef has increased the number of cattle marketed in this form. Cheaper gains have also been produced both in hogs and beef cattle by finishing with some protein concentrate to speed up gains and shorten the feeding period. One Illinois farmer reported that the improved system of feeding a balanced ration to his hogs made $800 more for him than he could have made with his former methods from the same number of pigs farrowed.

FIGURE 122. -The scrub ewe at left has scanty fleece and bare spots. Her lamb at right by purebred ram has no bare spots. The wool clip of the ewe was 3 pounds and of the lamb 8 pounds

Improved Products Bring Better Prices

In addition to direct increased returns reported by farmers through membership in livestock-shipping associations there has been a material increase in prices received due to members producing more nearly what the market demands. One sheep management demonstration in Missouri showed that the use of a purebred ram increased the price received for lambs $2.56 per head in comparison with the price received for lambs sired by a grade ram used on the same flock. This made a difference of $105 on the 41 lambs.

A North Dakota agent reported the pooling and selling cooperatively of practically a quarter of a million pounds of wool by about 200 growers. The pool price received was 4 cents per pound higher

than the prevailing price at the time of sale and 6 to 10 cents higher than the prevailing price at the time of delivery.

Among the later developments in the cooperative marketing of poultry has been the formation of turkey cooperative-marketing associations. Oregon reported one of these organizations with 280 growers producing 41,000 turkeys. One of these turkey raisers reported that selling through the organization resulted in an increase in price of at least 5 cents per pound. This meant an increased return of approximately $7,000 to the turkey growers of central Oregon.

These are a few instances of how farmers have increased their profits by the adoption of improved practices and management of a farm enterprise as recommended by county agricultural agents and the State extension service. On many farms the increased profit for one year on one enterprise was more than equal to the taxes on the farm or enough to put a modern water system in the home, buy important equipment for the farm, or pay a year's expenses of a son or daughter at college.

H. W. GILBERTSON,
Senior Agriculturist, Extension Service.

LIVESTOCK Tuberculosis Eradication Aided by Post-mortem Findings

Ever since the beginning of the systematic plan, now in effect, for the eradication of tuberculosis among livestock, the importance of post-mortem findings has been appreciated by those engaged in the work. Fortunately, there exists a reliable diagnostic agent, the tuberculin test, for use on the living animal. Without such a test the task of controlling and eradicating the disease would probably be impossible. Post-mortem examinations of the animals slaughtered also are valuable in showing to what extent tuberculosis has progressed in animals. This information serves in many ways to aid in the progress of the campaign for eradicating the disease.

Diseased Carcasses Are Impressive Evidence

Owners of tuberculous cattle, and other interested persons, have had opportunity to obtain first-hand information on the progress of this insidious disease in their herds by observing post-mortem examinations made by trained veterinarians at federally inspected abattoirs and elsewhere. The cattle owner unfortunate enough to have tuberculosis in his herd is usually convinced of the seriousness of this disease when he sees the tuberculous lesions revealed by autopsy. These demonstrations have been helpful in bringing about a better understanding of the campaign for the eradication of tuberculosis.

In the beginning of the work many field post-mortems were made when the campaign was to be taken up on a county-wide basis, or under what is known as the area plan. On those occasions a large number of people would gather to witness the autopsies conducted by skilled veterinarians. Fresh specimens showing the lesions were often placed on trays before the spectators.

In connection with the control and eradication of tuberculosis of swine and poultry, similar post-mortem examinations have proved to be highly educational. This is especially true in the case of poultry when autopsies can conveniently be made on the farm in the presence of

persons who take care of the poultry. These demonstrations have been useful in the eradication of poultry tuberculosis.

Tracing and Locating Centers of Infection

The efforts expended in connection with post-mortem examinations of tuberculous livestock would be fully warranted if their value were limited only to education, but there is still another feature of great importance to the campaign—the tracing of tuberculous infection to its source.

For many years the meat-inspection service of the department has used a form for reporting post-mortem evidences of tuberculosis and other infectious diseases found on autopsy of animals slaughtered under official inspection. It is often difficult and sometimes impossible to learn the origin of infected animals, but when this can be done very satisfactory results are obtained, especially in the case of tuberculosis of cattle and swine. Two typical cases may be cited.

In a carload of hogs, slaughtered in an officially inspected establishment on the Atlantic seaboard, more than half the animals were affected with tuberculosis. They had been purchased through a commission firm at a livestock market in the central West. The firm furnished information showing that the hogs originated on a certain farm in an adjoining State. An investigation disclosed that tuberculosis had existed among cattle formerly on the farm and steps were immediately taken to clean and disinfect the premises where they had been kept.

In another instance a large percentage of a small shipment of hogs received at a federally inspected packing house in the central West was found to be extensively infected with tuberculosis. An investigation indicated that the farmer who fattened the hogs purchased them from another farmer who had given to the young pigs the carcass of a cow that had probably died of tuberculosis.

Tattoo Marks Aid Identification

In the last few years the practice of tattooing hogs so that the identification marks can be seen on the dressed carcass has been followed extensively. This practice is largely encouraged by the fact that some packers have voluntarily paid a premium of 10 cents per hundredweight for hogs that originated in so-called modified accredited counties, signifying areas in which tuberculosis among cattle has been reduced to not more than 0.5 of 1 per cent. When tattoo marks are found on tuberculous hogs it is comparatively easy to trace their origin, since the tattoo codes are known to those in charge of the work.

Still other features of the program for eradicating tuberculosis largely depend on post-mortem reports. For example, in parts of the country where tuberculosis among livestock has been reduced to a minimum, careful post-mortem examinations are a reliable check on the condition of the animals within that area. Local practicing veterinarians can be of much assistance by reporting the results of autopsies made. Reports indicate that the numbers of tuberculous cattle and swine, found as a result of post-mortem examinations under Federal supervision, have been decreasing since the campaign has been well under way.

A. E. Wight,
Principal Veterinarian, Bureau of Animal Industry.

LUMBER for Farm Buildings Should be Well Seasoned Putting up farm buildings with lumber that is not dry enough results in a variety of structural troubles and defects. These include cracks in floors, plastering, and walls; rattling windows and loose-fitting doors; sagging and distorted walls; leaks around doors and windows; weakened structure caused by reduced nail-holding power; blistered paint; increased liability to decay, particularly near the ground line and in places where the wood dries out slowly; warped, checked, and cupped boards; and general distortion of the entire building.

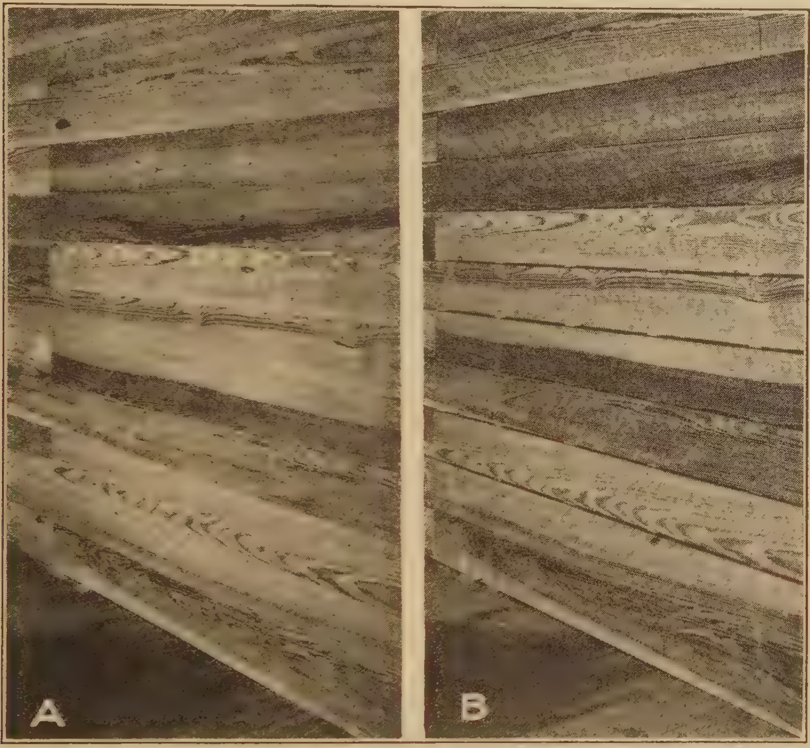

FIGURE 123.—A test panel made of green lumber (A) at the time of construction and (B) one month later. Note the cracks between the boards caused by the shrinkage of the lumber as it dried

Only thoroughly dry lumber should be used in frame constructions. This is because so much water is contained in green lumber that it will cause trouble by shrinking as it dries; and, in confined spaces, it may dry so slowly that it will decay before it becomes thoroughly dry.

The process of drying lumber is usually known as seasoning. In the seasoning process lumber loses most of the water that it contained in the living tree and shrinkage takes place in the wood. A 12-inch board of fir or pine may shrink as much as half an inch in width in seasoning. (Fig. 123.) Obviously this shrinkage should take place before the board is put into use.

Seasoning also causes an increase in the strength of lumber. A piece of wood is made up of thousands of microscopic wood cells, which, like the visible cells in a piece of bread, when full of moisture make the

piece soft and flexible and when dry make it hard and rigid. Furthermore, seasoned lumber is free from the attack of the fungi which produce decay or rot. Seasoned lumber also can be glued and painted satisfactorily, whereas green lumber can not.

Seasoned Lumber Should be Kept Dry

No matter how carefully lumber may have been seasoned, it must be kept dry, both at the lumber yard and on the job, lest it reabsorb large quantities of moisture from the air before being put to use. A common abuse of dry lumber, particularly that intended for exterior and interior house construction, is to leave it lying around unprotected until the time comes to use it. Dry lumber is often stored in a damp basement during the erection of the upper stories of the house, or, in the case of interior woodwork, is put up before the plaster has dried. All such practices are sure to lead to unsatisfactory service.

Wood intended for use in barns, hog houses, sheds, and similar structures need not be so dry as wood intended for the interior of houses, particularly in the Northern States. Once satisfactorily dried for interior use, such lumber may be bulk-piled in a dry unheated shed where it will then remain in satisfactory condition for an indefinite period.

Wood intended for use in the interior of heated houses should be stored in a drier place than an ordinary shed. If it can be stored in a house under conditions similar to those to which the wood is to be subjected in use, that will be satisfactory. Lacking this storage space, a warm, dry attic will make a satisfactory substitute.

Exterior window and door frames are often subjected to severe weather conditions during the course of erection, so that the usual priming coat is ordinarily not sufficient protection. Special effort should therefore be made to keep the frames out of the rain before and during erection and to protect them by paint at the earliest opportunity.

Rolf Thelen,
Senior Engineer, Forest Service.

MADAGASCAR Expedition Finds Rubber Plants Possibly Suited to U. S.

Although the island of Madagascar, lying in the Indian Ocean south of the Equator, is larger than France and possesses a rich tropical and subtropical flora, it had apparently never been visited by an American botanist prior to the writer's trip there in 1928 in company with Prof. Henri Humbert, of The University of Algiers. This expedition was sponsored by the University of Algiers, the Arnold Arboretum of Harvard University, and the United States Department of Agriculture, and had as its objective the collection of all the herbarium material possible from Madagascar, as well as living material of plants likely to prove of value to Algerian or American agriculture.

The expedition spent several weeks in the extreme southwestern part of Madagascar, where tree Euphorbias and many other vigorous plants flourish (fig. 124), notwithstanding the very pronounced aridity of the region. The annual rainfall here is frequently much below 10 inches, droughts lasting six months occur every year, and sometimes no rain falls for periods as long as six years. The plants that can withstand

such extreme conditions must either be able to store large quantities of water, or make efficient use of the dew.

Travel in such a dry region is extremely difficult. On one occasion six members of the expedition, including the writer, collapsed because of lack of water. Since the French occupation of the island in 1896 many automobile roads have been built; and though some roads now reach into southern Madagascar, much of the time the expedition was forced to travel by "filanzana"; that is, carried in a sort of sedan chair on the shoulders of four natives.

Throughout all Madagascar, and especially in the little-known southern part of the island, are found many plants that have some potential value for American agriculture. Chief among the numerous ornamentals are the Kalanchoes. With their striking beauty in flower and foliage there is combined a remarkable ease of propagation, and these succulent plants will undoubtedly prove to be useful additions to American horticulture, especially in the Southern States. Living material of 12 species of Kalanchoe were brought to Washington by the writer, and extremely satisfactory results in propagating them have been obtained.

FIGURE 124.—View in the Euphorbia forest of southern Madagascar: *Euphorbia enterophora*, the tall tree in the center

Rubber Producing Plants Obtained

Madagascar possesses a large number of plants that have been used commercially for rubber, and many others that have possibilities of exploitation. The expedition returned to Washington with 23 lots of potential rubber-producing plants, including 10 species which have actually been commercially utilized. Most of these plants are now being satisfactorily propagated for future trial in the United States.

Perhaps the most interesting material collected by the expedition consisted of live specimens of *Euphorbia intisy*, an almost extinct species of rubber-yielding plant. This plant, which is almost leafless, is able to withstand the extremely arid conditions characteristic of southern Madagascar by having a water-storing root system of unique type. Twenty-five years ago—long before order had been established in southern Madagascar—the rubber from this plant was highly prized in France for making automobile tires, and at the height of its commercial exploitation it commanded a price in excess of $1.20 a pound a high price at that time. But the high value of this rubber spelled the doom of the species as a commercial one, for the time, for the natives collected the rubber so ruthlessly that even botanists well acquainted with Madagascar feared the species had become entirely extinct. The expedition located some of these plants and brought living specimens back to Washington.

Propagations of the original intisy plants are now being obtained, and material for testing has been sent to California, Arizona, and Florida. It is hoped that localities will be found in these States where this valuable rubber plant will thrive—perhaps on a plantation basis, perhaps as a waste-land crop, growing slowly but surely, without attention on land now considered entirely worthless for agricultural purposes.

It will be many years before sufficient material has been propagated and the true worth of this plant established through field trials. Nevertheless it should be emphasized that many present-day American industries are based upon the introduction of but a small amount of plant material, such as in this case. Viewed in that light, progress with *Euphorbia intisy* has been very satisfactory.

CHARLES F. SWINGLE,
Assistant Pomologist, Bureau of Plant Industry.

MAYONNAISE Produced Commercially Since 1906 for Growing Trade Mayonnaise, like many other foods of commercial importance, originated as a home product. Housewives and other purveyors of foods endeavoring to prepare a salad dressing of desirable quality early took advantage of the fact that a combination of egg and a vegetable oil in proper proportion would, when rapidly stirred or beaten, produce a desirable emulsion. It was also found that such an emulsion with the addition of certain condiments and spices, would be semisolid, fairly stable, and palatable.

It was only natural that this product, which had gained popularity in so many homes, should become an object of commercial enterprise. Mayonnaise was first made commercially in the United States in 1906. Its growth as a commercial product has been rapid and constant, and to-day it is manufactured in practically all our large centers of population. Statistics show that in 1928 more than 7,000,000 gallons of mayonnaise were made, with a value of over $16,500,000.

By making possible the purchase of mayonnaise in convenient and attractive form in practically every community in this country, commercial manufacture has done much to increase the popularity of this food product. Commercial production has also brought about a fair degree of uniformity in the composition of mayonnaise and methods of its manufacture, whereas under household conditions there has always been the greatest diversity in the methods used.

Mayonnaise is an emulsion of the oil-in-water type in which, by agitation, the oil has been separated into globules of microscopic size. Each globule becomes coated with a thin film of the emulsifying agent, egg yolk, and thereby is prevented from coalescing with the other globules, at least for a time.

Between and around the globules flows the fluid which constitutes the liquid phase of the emulsion. For a proper conception of the requirements of this product it should be understood that with the exception of the egg and oil all its constituents exist either in solution or suspension in the liquid phase.

Constituents of Mayonnaise

Only an edible vegetable oil can be used for making mayonnaise. Cottonseed, corn, and sesame oils are the ones largely used for this

purpose, particularly the two first mentioned. Whatever oil is used must be pure, clear, and free from rancidity. Oil from cottonseed is a bland oil well suited to this purpose, but owing to a tendency to separation of the stearates it will often congeal at low temperatures. Corn oil does not congeal at low temperatures, but objections are sometimes made to it because of its flavor or color. For these reasons many manufacturers use corn oil in the winter and cottonseed oil in the summer.

Manufacturers differ regarding the proportion of oil to be used in mayonnaise, the range being from 50 to 80 per cent. The more common range is from 60 to 75 per cent. In the standard for mayonnaise adopted by the United States Department of Agriculture. The minimum for oil is 50 per cent and the minimum for the combined oil and egg content is 78 per cent of the entire product.

Egg in some form is used by all manufacturers of mayonnaise as the emulsifying agent. The concensus of opinion, based on ample experience, is that the use of egg yolk affords the best chance for securing the desired quality and stability of this product. The above-mentioned standard for mayonnaise recognizes only the use of egg yolk or whole egg. The egg yolk used may be either fresh or frozen. The latter has the advantage of being more convenient and seems to give results fully equal to those with fresh yolks. The possibility of its being highly contaminated with spoilage organisms must, however, always be taken into consideration.

Manufacturers Differ as to Egg Proportion

In regard to the proper proportion of egg to use, as in regard to the oil, manufacturers differ. It ranges from 6 to 20 per cent. More commonly, however, the range is from 8 to 12 per cent.

Vinegar or lemon juice is essential in the production of mayonnaise. This is necessary for the flavor, stability, and preservation of the product. The proportion of vinegar used is controlled largely by its effect on the flavor. The addition of 12 per cent of cider vinegar containing 5 per cent of acetic acid appears to furnish a desirable degree of acidity and also furnishes the required quantity of fluid for the liquid phase. Distilled vinegar, which is often used, usually has a higher acid concentration. It must, therefore, be diluted with water to furnish the proper degree of acidity and the desired volume of liquid.

Salt, an essential constituent of mayonnaise, is necessary for its effect both on flavor and the stability of the emulsion. It ordinarily constitutes about 1 per cent, by weight, of the entire product.

Mustard Generally Used

Mustard is the one spice which seems to furnish the flavor particularly desirable in mayonnaise. It is used by practically all manufacturers in about the same proportion as salt. Other spices, notably pepper, are sometimes added but are not essential.

Sugar is used by some manufacturers for its effect on flavor. Its influence on the keeping quality of the product can not be regarded as favorable.

In determining the quality of mayonnaise the following factors must be taken into consideration—color, consistency, flavor, acidity, and character of emulsion, as shown by microscopical examination.

Methods have been devised by which these factors can be determined with fair accuracy. With these results as a basis the relative merits of any given sample can be readily estimated.

Causes and Prevention of Spoilage

In spite of the greatest care in its manufacture and preservation, mayonnaise must always be regarded as a perishable product. The chief causes of spoilage are separation, rancidity, and color changes.

Separation can usually be prevented by the following measures: (1) Using good materials in proper proportion; (2) securing a perfect emulsion by proper whipping while the oil is being added slowly; (3) storing at an even and fairly low temperature. The most favorable temperature for storage is approximately that of the ordinary household refrigerator.

Rancidity is prevented by the use of good materials, chiefly good oil, exclusion of air and moisture during storage, and by avoiding exposure to high temperatures.

Color changes are prevented largely by the exclusion of air. Jars should be filled full, sealed tight, and stored at low temperatures.

As mayonnaise is normally an acid product, the activity of microorganisms is not a major cause of spoilage. This may occur, however, when these organisms gain admission in large numbers, either by being carried in with certain constituents or by reason of insanitary methods of production. The prevention of spoilage of this type depends upon the use of materials which do not contain excessive numbers of microorganisms, upon sanitary methods of production, and upon keeping the acidity at the highest point compatible with good flavor.

Mayonnaise Manufacturing Machinery

American ingenuity has gone far in providing machinery which is well adapted to the manufacture of mayonnaise. The essential part of the equipment is the mixer. This can now be obtained in almost any capacity desired. The important requirements of mixers are satisfactory operation at different speeds and the proper degree of agitation without inclusion of air.

Filling machines are now provided which fill containers smoothly and evenly from the bottom up, thus avoiding inclusion of air.

Mayonnaise is now very largely distributed in glass jars. These are provided with screw-cap covers, which furnish a practically air-tight seal.

EDWIN LEFEVRE,
Assistant Bacteriologist, Bureau of Chemistry and Soils.

MEAT Grading and Stamping System in Growing Favor

The Government's grade stamp on meat is becoming more and more important. Its significance from the standpoint of "consumer satisfaction" and its direct relation to quality is reflected in increased demands for Government-graded meats from all parts of the country.

The official grade stamp on meat prevents substitution and misrepresentation. Meat that bears the Government grade stamp is sold for exactly what it is.

The consuming public, although slow at the outset to appreciate the significance of the grade stamp on meats, has now rather generally come to realize it—hence the widespread demand for graded beef. Assured of quality, the average consumer returns for more. The Government's grade stamp provides that assurance. Through it retailers have come to realize that the average consumer is more concerned with quality than with price. Consumer confidence in the retail meat dealer is enhanced, repeat orders mean more business, and the livestock producer is benefited.

The official grade stamp on beef, which has now been available for two years, has demonstrated its economic value. This is now generally acknowledged by all branches of the livestock and meat industries.

It is now possible, through this meat-grading service, to handle long-distance transactions involving the purchase and sale of meats with confidence that the results will be satisfactory. Retailers place orders for Government-graded beef without having to visit the packers' coolers. The meat trade recognizes that the quality represented by a given grade name is always uniform within reasonable limits. Meat grading and stamping means a saving of time and expense and greater efficiency in retailing.

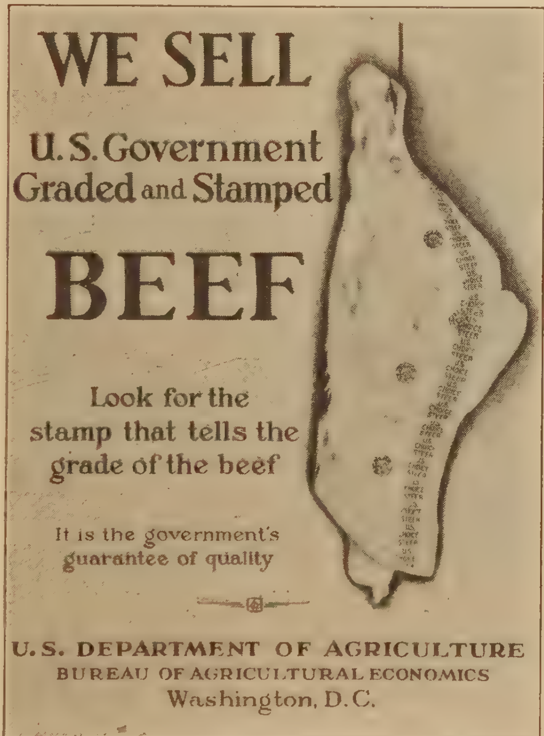

FIGURE 125. Poster used in establishments that sell graded and stamped beef

The meat-grading service has been a factor in increasing the patronage of railroad dining cars. Labor costs were reduced when it became possible to buy in accordance with official standards under the supervision of Government graders. Several important steamship lines report similar benefits. The better hotels and restaurants in some of the larger cities have taken advantage of the grade stamp. In fact, the stamp on meats is now a prerequisite in many hotels and restaurants.

Canada, after studying the results achieved in this country, has inaugurated a similar system of grading and stamping beef, and has passed legislation placing grading by private firms under the supervision of the Government. The Ministry of Agriculture in England

contemplates adopting a grading system similar to ours. Apparently the meat grade stamp is here to stay.

W. C. Davis,
Senior Marketing Specialist, Bureau of Agricultural Economics.

MEAT Inspection Under Federal Supervision Covers a Broad Field About 75,000,000 cattle, sheep, and hogs are being converted into meat annually under the supervision of the Federal meat-inspection service. This vast number must undergo the critical examination of trained and experienced inspectors. The work of this service begins by establishing sanitary conditions in plants where inspection is to be conducted. It is applied with equal force and care to the examination of the live animals, to the detailed performance of post-mortem examinations, and to the reinspection and supervision of all procedures in the preparation of meat and meat products.

A force of 2,450 professional inspectors and sanitary experts is required for this work at 800 establishments located in 250 cities and towns throughout the country. Besides protecting consumers, this comprehensive service is a means of locating infectious centers where diseased animals originate. It eliminates unfit meat from the food supply and insures wholesomeness, clean handling, and truthful labeling of meat and products, and is necessary in the exportation of our surplus meat.

The development of the Federal meat inspection began in 1890, when the first legislation was actuated by the demand for national certification of our meat sent abroad. This was followed by other laws which extended the Federal jurisdiction, but it was not until 1906 that Congress authorized the comprehensive control now operative.

Essential Requirements for Packing Plants

The first requirement is that meat plants shall be so constructed and equipped as to permit sanitary procedures which are described largely by the single word "cleanliness." This term involves ample distribution of water and light, effective ventilation, drainage, and protection from soiling. All these factors are dependent on the location, construction, and equipment of the plants.

When these physical essentials are provided in meat plants, the Federal inspectors assume personal jurisdiction. Their first duty is to examine the animals at close range, in motion, and at rest. They note abnormal actions and conditions. In questionable cases the animals are confined for close inspection and the taking of temperature. This ante-mortem inspection is essential to detect in the live animals certain diseases and unwholesome conditions which can not be recognized by inspecting the meat or internal organs.

The next major activity occurs when the animals are slaughtered. The veterinary inspectors are present when the lungs, heart, and other internal organs are exposed. The inspectors segregate and condemn those which are unfit for food as judged by a rigid standard for the protection of meat consumers. This procedure includes the main features of the post-mortem examination, which is an essential function of meat inspection. The fresh meat and organs found to be wholesome are

marked by the application of a harmless, purple fluid with a small, circular branding device showing the inspection legend.

Following the first inspections of the animals and of the fresh meat, repeated reinspections are made of the many cuts, parts, and products throughout all the various procedures of preparing, curing, canning, labeling, and packing. Unfit meat and products are segregated and condemned, and those fit for food are designated by truthful labels.

Laboratories Test Ingredients

Seven laboratories maintained in various parts of the country by the meat-inspection service are potent factors in the protection of health and in insuring the accuracy of labels. In the course of a year the laboratory work (fig. 126) covers the examination and analysis of more than 40,000 samples of meat products, water supplies, salts, spices, and other ingredients for the detection and exclusion of unwholesome substances. Other important activities of the service include supervision of the destruction of condemned animals and meat; the limitation of water and cereal in sausage to prevent adulteration; the cooking, refrigerating, or curing of pork to destroy trichinae which can not be discerned by any practical method of inspection; the pasteurization of dairy products used in the preparation of oleomargarine to eliminate dangerous organisms; the approval of many thousands of master labels to insure that no false or misleading statement appears on meat or container; and the supervision of meat transportation throughout the devious channels of commerce, as contemplated by law.

FIGURE 126.—Portion of a meat-inspection laboratory

There are penalties ranging from $1,000, or one year's imprisonment, to $10,000, and three years' imprisonment for violations of the laws authorizing Government meat control. These severe provisions may or may not have influenced the smoothly operating inspection during the past twenty-odd years, but it is a matter of record that infractions have been comparatively few.

Thus the protection afforded by Government meat control includes proficient examination as to the health of the animals and an expert inspection service extending throughout all phases of converting the animals into meat and product, and even to the labeled package ready for the consumer. This service is furnished at a cost of less than 7 cents for each animal slaughtered, or about 1 cent for each 26 pounds of dressed meat and lard produced.

R. P. STEDDOM,
Chief, Meat Inspection Division,
Bureau of Animal Industry.

MEAT Investigations Suggest Tenderness May Be Hereditary

When a stockman breeds or buys beef calves and places them in the feed lot he knows within a few pounds what these calves will weigh at the end of the feeding period. He can estimate within a few points what percentage of dressed carcass his finished cattle will yield when slaughtered. The cattle buyer who bids them in at the market, if he is well trained, will look at them on the hoof and judge within less than 1 per cent what they will yield on the rail.

And yet neither the farmer nor the market expert can predict with any certainty the quality of the meat of these cattle. Whether it will be coarse-grained or fine, dark red or light, tough or tender when cooked, can only be guessed. The hides of the animals may conceal points of superiority for which discriminating consumers would be willing to pay more money than that represented by the margin of profit of the man who fed the cattle. The carcasses may show a moderate covering of creamy-white, firm fat, and the knife which is used to separate the fore quarters from the hind may reveal that the animals had stored a generous proportion of their fat as marbling through the lean of their muscles. The hide of a beef steer is indeed well named. It conceals factors which largely indicate the true value of the animal.

Measure of Quality Under Investigation

For the purpose of isolating some of the factors responsible for quality in meat, and setting up standards for measuring and recognizing them, the department undertook a study of the subject in cooperation with a number of State experiment stations and other agencies. Efficiency in dairy animals has long been accurately measured by the quantity and quality of the milk produced. Poultry efficiency, in part at least, can be determined by egg production. The quality and value of a racing animal are determined by the number of minutes and seconds it needs to cover a given stretch of turf. The amount of clean wool and its fineness can readily be determined for a flock of sheep. But for meat animals the only measure of efficiency has been quantity of meat production. The quality of the meat and its tenderness and palatability when cooked could be known only after the animal had been slaughtered, and its flesh eaten.

Thus breeders of meat animals have been greatly handicapped in the formulation of any definite program for the improvement of their stock. Experiments to date indicate that the solution of the problem is in some respects simpler and in others more complex than was expected.

To any of the followers of this project who hoped that research would evolve some miraculous feed combination which would guarantee the production of ideal flavor and tenderness in the meat of all animals, no matter what their breeding, it is necessary to say that it is idle to entertain hopes for so simple a conclusion.

Some Typical Results

In a number of observed instances there was more difference between the meat of two animals of the same lot (fig. 127) than between that of two animals from two different experimental lots which were handled under widely varying methods of feeding and management.

In a lot of grade steers and heifers purchased on the Chicago market in October, 1928, to be used in this series of investigations, were a red steer and a black one which weighed within 17 pounds of each other and graded within 2 points (on scale of 100) of each other as feeder calves. After a 210-day feeding period on an excellent ration of grain, legume hay, and corn silage they showed average daily gains differing by only 0.17 pound. They differed by but 2½ points when graded as slaughter cattle, and their carcasses lacked the same number of points of grading alike

The two steers were absolutely consistent in their behavior at the hands of the various grading committees, maintaining the same rela-

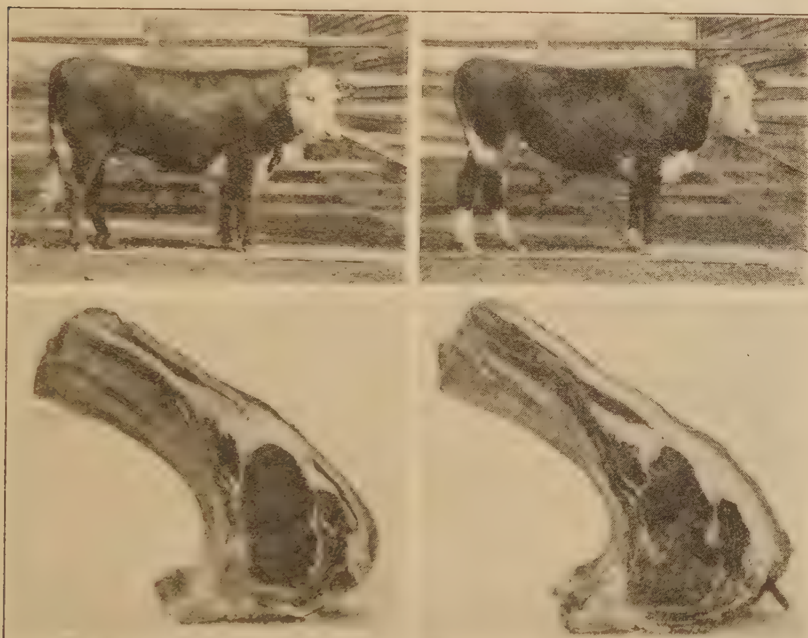

FIGURE 127.—Two apparently similar steers that yielded dissimilar cuts of meat. These steers entered the fattening period, of 130 days, weighing alike and grading alike. On the same feed—corn, cottonseed meal, and pasture—the steer on the right gained nearly three-quarters of a pound more daily and its carcass graded higher. A 3-rib roast from it (also on the right) weighed 30 per cent more uncooked and 25 per cent more cooked than the corresponding cut of the other steer, besides being juicier and superior in flavor, though both were equally tender. Such variations justify the search for more certain methods of producing superior meat animals

tive position, with the red steer always ahead and by about the same number of points, as feeder calves, as finished cattle, and as carcasses.

When ribs from these steers were examined in the laboratory, however, striking differences were found. The rib of the black steer showed a 10 per cent larger "eye," which is the portion best for slicing in a rib roast of beef, and analyzed 20 per cent more protein than that of the red steer. This was no doubt because the red steer's rib was fatter, and showed remarkably more fat marbled through the rib eye. Its rib analyzed 16 per cent more fat in the total edible portion, and 21 per cent more fat in the eye than the rib from the black steer.

Differences in Meat of Apparently Uniform Carcasses

A mechanical test for tenderness of the cooked rib muscles of the two animals showed that a force of 5 more pounds was needed to shear the fibers and tissues in the 1-inch sample from the black-steer roast than in the red-steer roast (26 pounds for the one and 31 pounds for the other). The final verdict of the palatability committee which graded cooked samples of the meat, without knowledge of their origin, agreed with the tenderness test of the uncooked meat by rating the cooked meat from the red steer more tender by 1.4 points out of a possible 7.

Here, then, were two steers which weighed alike, were fed and handled alike, which looked very much alike except for color, which were graded very closely alike on the hoof as feeder and later as slaughter cattle, and also on the rail as chilled carcasses ready for distribution to the trade, and yet when the meat from their respective carcasses was examined striking differences were discovered. This is only one of many similar cases.

In November, 1927, a bunch of grade Hereford steers and heifers were purchased in Texas and shipped to a middle-western State experiment station, where the animals were placed on feed in the cooperative meat investigations. The history of all these animals is interesting when traced through the feed lot, the meats, histological and chemical laboratories, and finally through the cooking laboratory to the final palatability tests, but heifers Nos. 16 and 17 will be traced through quickly as constituting another case in point.

Although No. 16 weighed 75 pounds more than No. 17 at the beginning of the experiment and graded half a grade higher, the latter animal gained over half a pound more each day during a feeding period of 205 days during which they received a ration of shelled corn, oats, alfalfa hay, and corn silage. Its total gain was 115 pounds more, so that it weighed 40 pounds more than No. 16 at the conclusion of the test and had closed three-fifths of the gap in grade that separated them. No. 16 as a slaughter animal therefore scored but 2 points above No. 17. The carcass grading showed that the judges considered the carcass of the faster gaining heifer superior by nearly 3 points, or a third of a grade, to the heifer which appeared better on foot. In dressing percentage the two were within 2¼ per cent of each other.

The faster gaining animal showed considerably more surface fat and slightly less marbled fat than the other.

Then rib roasts of the two were cooked by the standard cooking method and tested. The mechanical shearing test showed that the cooked meat of the fast-gaining animal required 50 per cent more force for its shearing, and the palatability committee pronounced that this same meat was 2¼ points less tender than the other—or, in plain language, that the one was tender and the other tough.

One might conclude that the rapid gains were responsible for the sacrifice in tenderness, had the records not showed that other animals in this same test which gained equally fast yielded tender cooked meat when judged by both man and machine.

Results Point to Individuality as Chief Factor

A study of the records of this and other tests in the quality-of-meat project leads to the conclusion that individuality is perhaps the most

potent factor of all in determining whether meat shall be tender or tough, of high quality or of inferior quality.

Histological examination of muscle fibers of animals which have received the same feed-lot treatment shows characteristic differences in size, structure, and arrangement of fibers, membrane, and connective tissue. The meat of no two animals behaves in like fashion when subjected to a number of tests which have been developed.

As a check against these observations muscle from a number of the bureau's inbred families of guinea pigs has been examined. Some of these families are the consummation of 29 generations of continuous brother-sister matings. They have the same genetic characters and throughout a period of years have behaved with remarkable uniformity when measured by such yardsticks as rate of growth, size, frequency, and vigor of litters, longevity, and resistance to diseases.

Examinations to date have produced striking similarities in the muscle structure of the meat from guinea pigs of the same inbred families, with characteristic dissimilarities in that of guinea pigs of different families.

Tenderness in Meat May be Hereditary

Here, then, is a working hypothesis which promises much. Observations with small laboratory animals have borne out theories gathered when working with the larger meat animals. The smaller animals are of known breeding, free from genetic variation.

No factors known to influence the tenderness and palatability of meat have been purposely bred into these animals. Yet many or all of the factors influencing quality in meat have no doubt been segregated in them. It remains to determine them and to learn how they behave.

If it could be assumed that a single factor, unlinked with other factors, is responsible for tenderness, the problem would be simple. If many factors are concerned, the problem is more complex. These factors may be dominant or recessive, but in any case it is theoretically possible to produce animals which will breed true.

The ultimate aim will be to develop strains of the larger domestic animals that will breed true to a definite standard of quality. They will be superlivestock, not perhaps in size, nor in weight-gaining ability, but in the quality of their products.

E. W. SHEETS,
Principal Animal Husbandman, Bureau of Animal Industry.

MEXICAN Bean Beetle's Damage Severe After Record Winter Survival

The Mexican bean beetle survived the winter of 1928–29 in the southern and eastern Atlantic States in the largest numbers hitherto recorded and as a result beans were seriously injured during the season of 1929 where control measures were not practiced. The beetle is now known to be present along the Atlantic Coast from Georgetown County, S. C., to northern New Jersey. It was reported as far south in South Carolina as Dorchester County. To the northeast it has spread into three counties of Connecticut.

In Michigan its spread increased 40 miles westward, but the beetle apparently did not survive in Ingham County, where it was found last

year. Likewise in Indiana it spread 20 miles west, into Kosciusko County, but could not be found in Whitley County, where it was found in 1928. In southern Indiana it reached the Illinois line at Vincennes in Knox County, 20 miles west of the 1927 limit of distribution in that section. Considering the new infestations in Hardeman County, Tenn., and Benton, Tippah, and Lowndes Counties, Miss., together with those given above, it would appear as if this pest will gradually spread over the Mississippi Valley. (Fig. 128.)

Reports from the Southern States indicate that the beetle has been more numerous and injurious than at any time since it reached the eastern part of the United States.

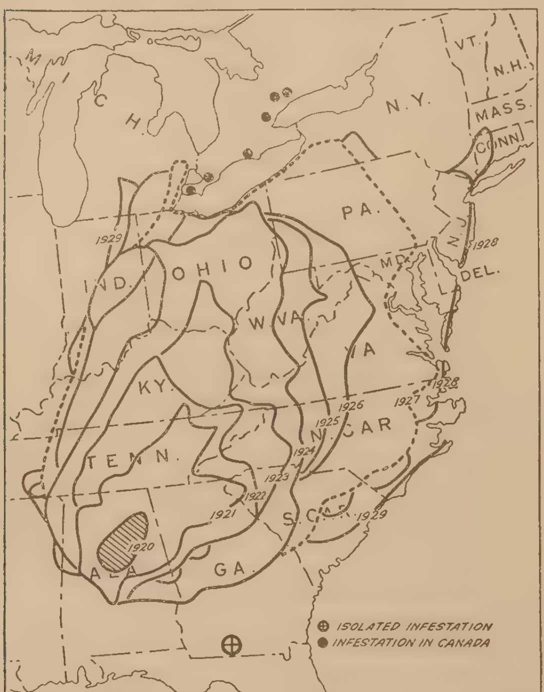

FIGURE 128.—Distribution and spread of the Mexican bean beetle in the Eastern States, 1920–1929

Important Bean Districts Invaded

For the first time since its discovery in the East in 1920 the Mexican bean beetle has invaded the important bean-growing districts of the Eastern Shore section of Maryland, Virginia, and Delaware. Fortunately this extensive bean acreage is on level land which is well adapted to the use of power or tractor driven spraying machinery. A large number of the growers and canners in that section equipped themselves early in the season to treat the bean crop, and the result has been in general a satisfactory control of the pest, especially where liquid spraying has been practiced, the best results being obtained by the use of magnesium arsenate. By the use of 8-row sprayers a large acreage can be covered effectively at a minimum expense, and the successful control of the beetle in this important bean-growing area now appears certain.

Hibernation records obtained in Ohio for four years compared with records obtained in Alabama for eight years, and in other Southern States, indicate that the survival of the Mexican bean beetle depends to a large extent on the minimum winter temperatures. The survival in the Southeastern States is many times greater than the survival in the Northern States. It seems quite likely that the Mexican bean beetle will not survive the winters in either Michigan or New York in sufficient numbers to build up a population that will cause great damage to the bean crop except during mild years. During the past

few years the insect has become rather abundant by late summer in Chautauqua County, N. Y., along Lake Chautauqua, but is scarce in Erie County, immediately to the north. While it has not as yet caused any damage in the bean districts of Michigan or New York, it should be watched carefully.

NEALE F. HOWARD,
Senior Entomologist, Bureau of Entomology.

MIGRATORY-BIRD Refuges to be Increased Under New Conservation Act In passing the migratory bird conservation act, the Seventy-first Congress gave its approval to the adoption by the Federal Government of a comprehensive plan for bird protection through the creation of refuges. The act, which was signed by the President on February 18, 1929, authorizes the provision of funds to survey, acquire, and establish large tracts of land and water throughout the country, to be maintained thereafter and for all time as sanctuaries for birds of species that migrate between this country and Canada. Unquestionably the act comprises the most significant and important item of Federal legislation enacted for the protection of wild life since the passage 11 years before of the migratory bird treaty act. By the nature of its provisions it indicates public acceptance of the sound principle that game laws and regulations on hunting can not alone be relied upon to maintain forever our native birds and animals.

The truth is well established that modern conservation methods in wild-life administration, while not failing to take due cognizance of the effect on game of the annual kill by the gunners, must also give equal attention to the less direct influences of civilization and industry. The changes produced by many forms of industrial activity in the natural environment of the native wild creatures, make it more and more difficult for them to live. Among such influences are deforestation, with its attendant destruction of cover, stream pollution, damaging fires, and drainage. These matters, particularly drainage and the diversion of water from natural reservoirs and channels, are influences of such vital significance to water birds, mammals, and fish as to suggest the axiom that in order to protect wild life Americans must protect its habitat. In this brief axiom is comprehended the purpose of the migratory bird conservation act.

In their earlier history American wild-life conservation policies were chiefly concerned with the enactment and enforcement of measures that restricted hunting, and at that time the need for action to preserve the habitat was not so apparent. Then it was of obvious and immediate importance to curb the slaughter of game for the market, and to modify the laws that permitted spring shooting, a pernicious practice under which in some localities certain species of game birds might legally be taken without restriction as to numbers for nine months of the year. It was evident also that nothing less than action by the Federal Government would serve to bring about the harmony of effort so necessary for the uniform protection of the migratory birds that twice every 12 months visit practically every section of the continent from the Arctic regions to the Gulf coast and beyond.

Principle of Federal Control

The migratory bird law of 1913 advanced the principle of Federal control of these species by enjoining spring shooting and through its influence on the public mind, but it failed to accomplish all that the situation demanded. The migratory-bird treaty of 1916 between the Government of the United States and that of Great Britain gave the solid foundation for necessary legislative action in this country and in Canada, and the migratory bird treaty act, passed in 1918, gave the treaty effect in the United States, as did the migratory birds convention act in Canada. By the provisions of the Federal law, Congress definitely placed with the Department or Agriculture the responsibility for the administration, protection, and maintenance of stated groups of the migratory birds. The Secretary of Agriculture was authorized to make regulations establishing open seasons and defining the manners and methods by which ducks, geese, and shore birds could legally be taken. Funds have been annually appropriated to enforce the act.

Immediately, under the authority of the treaty, the open seasons on migratory game birds were reduced to not to exceed three and one-half months in each year throughout the country; and spring shooting was forbidden, as also were the marketing and commercialization of migratory game. Bag limits were established, and, in spite of the rather limited funds available for enforcement of the regulations, important advances were made in checking the wasteful, thoughtless, and greedy practices that hitherto had prevailed.

The rattle of the guns in the marshes in early spring was stilled; no longer were the carcasses of ducks and geese, slaughtered by the thousands and shipped in carload lots, displayed for sale in the city markets. Here and there, as might be expected, individuals broke the laws and, as is done to this day, carried on a furtive illegal poaching business, but the total effect was small, as compared with such practices during the long years when unrestricted shooting was the rule and not the exception.

Changes in the Habitat of Game

But with these changes, accomplished only after many years of ceaseless effort, other aspects of the problem became apparent. In the period while sportsmen and nature lovers alike were fighting for harmonious and effective legislative control of game killing, vast changes were taking place in the land on which the game species had been living. Chief among these was the tremendous decrease of the natural marsh and water areas brought about by drainage. Accorded a saving protection from the evils of overshooting, the waterfowl were now faced with a menace of even greater magnitude, since it threatened to destroy the particular areas so necessary to their existence. The time was at hand for definite corollary action to support sensible restrictions upon the gunner by adopting methods to conserve the birds' habitat.

There are some wild birds and animals the habits of which are such that they can not only adjust themselves to a changed environment but they may even benefit by such change and by a moderate degree of association with the human population. To the water birds, how-

ever, the water areas in marshes, lakes, swamps, and rivers are the greatest essential to existence. No one can raise justifiable objection to the drainage and reclamation of water and marsh areas when it can be shown that the result will be of definite benefit to mankind; but when, as has often happened, the destruction of a marsh zone not only brings no such benefit, but instead destroys to no purpose the habitat of many valuable birds, animals, and fishes, the undertaking inspires public regret and ultimate reproach.

The establishment of a great national system of wild-fowl sanctuaries—even though it may require years to accomplish—will prevent the total and irreparable destruction of many important portions of the natural wet-land environment that still remains. With such areas set aside as refuges, it should not be difficult to maintain migratory game birds in reasonable abundance for all time to come. While the new migratory bird conservation act refers specifically to migratory birds and seeks to maintain feeding, nesting, and resting grounds for the various ducks, geese, shore birds, and others, actually there are numerous additional species, including mammals and fishes, that will find sanctuary in these refuges.

No Shooting in Refuges

The fact that no shooting of beneficial species on these areas will be permitted is of peculiar significance, for with the constant decrease of territory adapted to waterfowl, the distribution of shooting stands has a deleterious effect on the birds, one that in driving them from their feeding and resting grounds is nearly if not quite as destructive from the standpoint of game conservation as is the shooting of great numbers of birds each year by hunters. Modern facilities for rapid individual transportation, such as are supplied by the automobile and the motor boat, have enabled gunners to penetrate to areas once isolated and remote. In consequence, vast tracts of marsh and bog that once, because of their inaccessibility to hunters, served the wild fowl as natural sanctuaries, are now shot over as regularly as are resorts more conveniently located. In some regions during the open seasons the birds have no opportunity to feed or rest during the daylight hours.

In order to carry out the purpose of the new law, it is necessary to ascertain by examination of the numerous potential areas to be found throughout the United States those that are best adapted for refuges, to make appraisals in order to determine their character and value, and to conduct other activities incident to their acquisition. The Migratory Bird Conservation Commission created by the act will consider and pass upon lands examined by the Bureau of Biological Survey and recommended by the Secretary of Agriculture for purchase or lease for refuge purposes. The Secretary of Agriculture is chairman of the commission, and the other members are the Secretary of Commerce, the Secretary of the Interior, two members of the Senate, and two members of the House of Representatives. In addition, to provide for cooperation with the States, the head of the game administration branch (or if there is no such office, then the governor or his representative) is made a member of the commission to consider and vote on all questions relating to the acquisition of refuge areas in his State that come before the commission.

Appropriation for Refuge-Land Investigations

An appropriation of $75,000 was made available on July 1, 1929, for use in the work of investigating lands proposed for acquisition as refuges. This preliminary work is in charge of crews of trained biologists and land-valuation engineers working under the direction of the Bureau of Biological Survey. Annual appropriations amounting to a total of $7,875,000 for the 10-year program of land acquisition and refuge establishment are authorized by the act, and a continuing appropriation of $200,000 annually thereafter for the maintenance of the refuges.

The units selected for migratory-bird refuges must be of such character as will best serve the purposes contemplated. Usually they will be more or less extensive areas of lowland, comprising marsh and woodland contiguous to or embracing water areas, or they may be areas that were formerly well suited as feeding and nesting grounds for migratory birds, but though now useless by reason of drainage developments or evaporation, are subject to restoration to their natural condition. The reports by the crews engaged on surveys will necessarily have a determining influence in the final selection of units for acquisition and maintenance, but an effort will be made to furnish in every general section at least one extensive refuge, so that the benefits of the system will be available to the birds everywhere throughout the country.

The new conservation measure indicates unmistakably that the United States of America recognizes the tremendous importance of its migratory birds as aids in the development of agriculture, for esthetic purposes, and as a food supply and a source of wholesome recreation.

H. P. Sheldon,
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Bureau of Biological Survey.

MIGRATORY Status of Mourning Doves Is Proved by Banding

The mourning dove (*Zenaidura macroura;* family Columbidae), known also as turtle dove and Carolina dove, is distributed over the North American Continent from Panama to southern Canada. This is the greatest range of any American member of its family. As its food consists almost exclusively of seeds and grain, the mourning dove is of considerable importance to the farmer, and its value is enhanced by its being an important game bird in many States.

Few birds exert a stronger esthetic and emotional appeal than do mourning doves. The trim beauty of their form, the soft delicate shade of coloring touched by spots of metallic luster, the whistling sound emitted by the rapid beat of wings in the swift arrowlike flight, and the soothing plaintive quality of their cooing love-note have almost a universal appeal to the finer human sentiments.

Mourning doves nest over the entire United States. The two white eggs are laid in a flimsy nest of sticks usually situated in the lower branches of a tree but sometimes on the ground in the eastern portion of their range. The most important section of their winter range is in the southern part of the country.

Found in South the Year Round

In many States, particularly in the South, mourning doves may be found during every month of the year, and it is probable that some of these individuals are not migratory to any considerable extent if at all, but remain in practically the same region throughout the year. Nevertheless, in common with other migratory species, mourning doves are protected by Federal law. On the basis of information then available regarding their interstate and international movements, a judicial decision was rendered in the Federal court at Athens, Ga., in 1921, which pronounced these birds entitled to the protection afforded by the migratory bird treaty act, even though individuals of the species may remain yearlong within the borders of certain States.

With a view to assembling more complete and definite information regarding their migratory movements and habits, more than 4,000 mourning doves have been banded since 1921 by volunteer cooperators of the Bureau of Biological Survey. From these more than 250 return records already have been received. A study of the scientific data thus obtained definitely establishes the wide-ranging character of the migratory activities of these birds and provides additional positive information in support of the judicial decision cited.

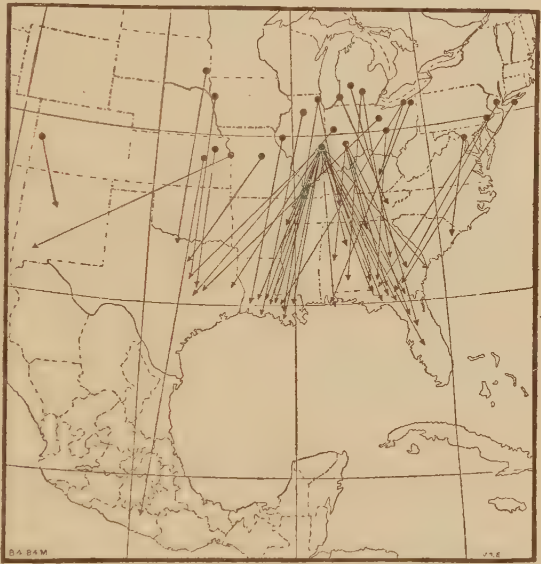

FIGURE 129. Migratory routes of mourning doves as shown by banding records. Black spots indicate places where the birds were banded; arrows point to localities where the same individuals were recaptured. The straight lines are not intended to represent the actual course taken by the birds in their flights, but to connect points where banded and recovered

Figure 129 shows only a few examples of these flights, as it is impossible to include on so small a map all of the information now available. Some of the lines, however, represent return records for three or four different birds the points of banding and recovery of which were approximately identical. Banding mourning doves has revealed many detailed specific facts that are of interest and significance in connection with the annual northward and southward movements of the birds and their status as migrants entitled to protection under the provisions of the migratory bird treaty act and the regulations promulgated thereunder.

As with studies of banding returns of other kinds of birds, it is necessary to consider the movements of mourning doves from two standpoints: (1) Those birds that have returned to the region where they were banded and have been retaken there after the lapse of a full migration season; and (2) those that have been recaptured and reported from points at some distance from the place of banding.

Return to Former Nesting Places Proved

Under the first category abundant evidence has been obtained to prove conclusively that mourning doves may return many times to breed again in the locality where they nested during previous years. At one banding station in central Illinois no less than 66 return records have thus far been reported of individual doves that had been banded at this point in former years. The records of the Bureau of Biological Survey contain similar cases from Pennsylvania, Ohio, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Georgia, Louisiana, Texas, and California.

Considered by themselves these records might be construed to mean that these doves did not migrate at all, but had remained near the point of banding throughout the year. This mistaken interpretation is particularly apt to be made because it is known that mourning doves occasionally will spend the winter as far north as Massachusetts, Indiana, Illinois, and Colorado. Such cases are rare, however, and observations made continuously throughout the year in these regions have shown that there are few, if any, doves present there during normal winters. Furthermore, in the Central and Northern States the return records of birds recovered at the point of banding were obtained during succeeding breeding seasons and not during the winter months, which in itself indicates that the birds are accustomed regularly to go south in the fall and to return the succeeding spring. A few individuals have been retrapped at the same banding station in two successive years. For example, two birds banded in April and May, 1925, at Kansas, Ill., were recaptured at the same point in 1926 and again in 1927, while one banded at Crystal Bay, just north of Minneapolis, Minn., in June, 1925, was recaptured there in June, 1926, and again in July, 1927.

Some of the doves that were banded in the Southern States late in the winter or early in the spring probably made no migration to the North but nested in the same general region. It is significant, however, that in the case of all reports of the return of doves banded in such Southern States as Georgia and Louisiana, there was a period of several months or a year between the dates of banding and recovery, which would allow the birds to make a trip to the North and back again during the interval before being retaken.

Final Proof of Migration

The final evidence to establish completely the migratory status of mourning doves is furnished by many birds that have been banded in Northern States and recovered far away in the South, either during the same or in succeeding years. It is interesting to note from banding records of such birds that the majority of the doves that breed in the Northern States apparently spend their winters in the States of Georgia, Louisiana, and Texas. This is graphically illustrated by the map, which shows points of banding and recapture of doves for which return records have been received.

The State of Georgia seems to contain the favorite wintering grounds for the mourning doves of the eastern part of the country. No less than 15 records have come from that State, representing birds that were banded in Illinois, Michigan, Indiana, Ohio, Pennsylvania, New York, and New Jersey. Louisiana comes next, with 12 records, but

strangely enough these come from only two States: Illinois and Ohio. Texas ranks third, with 9 records of doves banded in South Dakota, Iowa, Kansas, Missouri, Illinois, Indiana, and Ohio. Six doves banded in Illinois, Michigan, Indiana, and Georgia were recovered in Florida, and five others from Illinois, Michigan, Indiana, and Ohio were taken in Alabama. Along with these records of recoveries in the principal winter range of the species, there are many intermediate points represented in the banding records, giving returns for these birds from points scattered through South Carolina, Tennessee, Kentucky, Arkansas, and Missouri.

As in all groups of return records from banded birds, there are a few cases of unusual flight routes, two of which are shown on the map. One is of a young bird that was banded at Kansas City, Kans., in June, 1927, when it was just beginning to fly, and was shot in Luna County, N. Mex., on September 17, 1927. This bird had flown southwestward instead of following the course due south, as did other birds banded in the same general region. The other record was of a bird banded at Fort Riley, Kans., on July 5, 1926, and shot at Apipilulco, State of Guerrero, Mexico, in January, 1927. This represents the longest migratory flight yet recorded for a mourning dove.

To sum up the meaning of the facts deduced through application of the banding method for determining the migratory movements and status of mourning doves, it has been conclusively shown that these birds are migratory in habit and that their flight is both interstate and international; that they may return to the same point to breed during succeeding years; and that there is a marked tendency for birds reared during summer over a widely distributed area in the northern part of their range to congregate during winter in a relatively restricted region in the South. Establishment of these facts is of importance in considerations of their esthetic worth and economic status and in taking effective steps to afford them adequate protection.

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MORTGAGE Debt on U. S. Farms Increasing But at a Decreasing Rate Long-term loans secured by farm land and buildings continue to grow in importance as a means of financing the American farmer. According to recent estimates, the total farm-mortgage debt rose from \$7,857,700,000 in 1920 to \$9,360,620,000 on January 1, 1925, and further increased to \$9,468,526,000 by January 1, 1928. These figures represent an increase of 19 per cent from 1920 to 1925 and a further rise of 1 per cent from 1925 to 1928.

For the 3-year period ended January 1, 1928, the largest relative increase in mortgage debt occurred in the South Atlantic States, an increase of 12 per cent above the debt in 1925. The debt in the East South Central group increased 7 per cent, in the West South Central and East North Central 5 per cent, and in the Pacific group 3 per cent.

Four geographic divisions showed declines in amount of farm mortgage debt, the Mountain States having a reduction of 7 per cent below the amount in 1925, the West North Central 2 per cent, the Middle Atlantic States 3 per cent, and the New England group 1 per cent.

Debt on full-owner farms and part-owner farms constitutes much the most important part of all farm-mortgage debt, the total for these forms of tenure being $5,560,017,000 in 1928, while debt on all tenant-operated farms amounted to $3,644,009,000, and debt on farms operated by managers was only $264,500,000.

Of a total of 22,352 farms which had not changed ownership or tenure during the period 1925 to 1928, 8,159 carried mortgages on January 1, 1925, and 8,327 had mortgages on January 1, 1928. This was an increase of about 2 per cent. All forms of tenure showed increases in the percentage of farms mortgaged. The frequency of debt among all full owners in the above group increased from 36.8 per cent to 37.1 per cent, and on tenant-operated farms from 35.9 to 37.5 per cent, while the mortgage frequency of the total of these classes, plus manager-operated farms, rose from 36.5 per cent to 37.3 per cent of the number of farms reported.

Debt on Part-Owner Farms

Part-owner farms generally have a much higher frequency of debt on the land owned than do farms of other forms of tenure. This increase of approximately 40 per cent is a natural consequence of the heavier financing requirements for operating additional land. Farms operated by tenants usually have lower frequency of farms mortgaged than do farms operated by owners, partly because the owner generally does not finance current farm operations. However, the percentage of mortgaged tenant-operated farms appears to have increased to a point not far below the frequency of mortgaged owner-operated farms.

Inquiry concerning mortgage changes on those farms which transferred title during the three years following 1925 indicates that the number of such farms mortgaged had increased also, and that the amount of mortgage debt carried was larger than in 1925. Mortgage debt often arises incident to transfer of land whereby the buyer obtains a loan on the land as a means of partial payment.

As a whole, the results indicate that farmers have been using their land as security for loans to an increasing extent during recent years and that this has been true of farms which have remained in possession of the same owners as well as of those which have changed hands.

Certain significant differences appear in the debt changes occurring in the various geographic divisions. In general, the States of the South Atlantic, East South Central, and West South Central groups showed increases in the order named. On the other hand, the Western States, which have been farmed a shorter period of time, showed the greatest decreases. It may be noted that the mountain and western lands were the first to show marked decline in value after the World War. Now it appears that the western areas are the first to show reductions in the volume of farm mortgages.

Increases For Each Form of Tenure

Increases for the country as a whole appeared for each form of tenure although tenant-operated farms showed a greater rise than did farms operated by their owners. This increase of debt on tenant farms probably was due in part to the fact that the debt on this class of farms in 1925 was a definitely smaller percentage of their value than was the case with owner-operated farms, and consequently loan

agencies were willing to increase the loans on many tenant farms having moderate encumbrance, despite a generally more restrictive policy on new loans and a frequent reduction on renewal of loans.

Ratios of debt to value of mortgaged farms offer further light on developments in farm mortgages. The reports from over 22,300 farms scattered throughout the country, when taken as a group, showed a ratio of debt to value of full-owner farms of 40.4 on January 1, 1925, and of 39 three years later. The ratio on tenant-operated farms rose from 36.6 to 37.5 and on manager farms from 32.1 to 32.7. The similar ratio for the total of these farms declined from 38.5 to 38.1.

When the data are adjusted to reflect current conditions in each State and are expressed as a ratio of total mortgage debt to the value of all farms, whether mortgaged or not, it is found that the ratio rose from 11.8 in 1920 to 18.9 in 1925, and to 20.9 in 1928. It thus appears that the amount of farm mortgages at the beginning of 1928 was slightly over one-fifth of the value of all farm land and buildings in the United States.

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NEMAS Causing Plant Galls Controlled Best Through Crop Rotation

The control of plant diseases caused by eelworms or nematodes, often called nemas, is extremely difficult because the soil around infested plants is always contaminated and is a source of continual reinfestation. If nemic pests were restricted to the plants proper, control would be possible by destroying them. A hot-water treatment could be applied to valuable nursery stock, such as bulbs, corms, tubers, and dormant and even growing plants. Such a treatment is already in use to rid bulbs of the bulb or stem nema, *Tylenchus dipsaci* (110° to 111.5° F. for two and one-half hours); to kill the root-knot nema, *Caconema radicicola* (formerly called *Heterodera radicicola*), in infested roots (118° for half an hour); or to cure strawberry plants of the strawberry nema, *Aphelenchus fragariae* (118° for half an hour). The value of this method in the fight against noxious nemas is not limited to the saving of valuable plants. It affords also an opportunity to check the distribution of such pests through infested nursery stock.

The main problem, however, in our battle against nemic pests is to grow crops on contaminated soil to free it of the infestation. Chemicals of various kinds (carbon bisulphide, calcium cyanide, etc.) have been tried, with more or less success but in no instance with full satisfaction. The reasons for nonsuccess are varied. The soil is an extremely difficult object for chemical treatment because of its varied chemical and physical structure. Chemicals applied in solid, fluid, or gaseous form may be changed before their action takes place, and soil water, air pockets, etc., interfere. Such treatments may be impracticable also because of the expense involved or because of danger to health during application. Drowning also has been tried but thus far without great success. The root-knot nema was found to be still active after five months' submersion. Fallow with absolute control of the weeds and repeated tillage exposing the soil well to the sun's rays has been found very helpful in the fight against root knot, but not so

much so in other cases, e. g., the sugar-beet nema (*Heterodera schachtii*). Soil sterilization by heat is successful but can be applied only to greenhouse, seed-bed, and similar soils. But there is a disadvantage connected with all the mentioned methods, in that beneficial organisms also may be destroyed and the physical and chemical character of the soil is unfavorably influenced.

Underlying Principle of Control Methods

Therefore control methods based on the behavior of noxious nemas toward various plants have been developed. The underlying principle of all these methods is the fact that some nemas prey only on one or a few species of plants, or, if many are attacked, some are given preference. The citrus nema (*Tylenchulus semipenetrans*) has been found only on members of the citrus family. The root-knot nema, however, is already known to attack about 700 various plants. Plant-parasitic nemas recognize and locate the hosts they prefer. Strange as it seems, the preference shown by a population of one species to one kind of plant, e. g., the bulb or stem nema (*Tylenchus dipsaci*), is not shared by all the populations of this same species. Thus the bulb nema in some locations may exhibit a preference for narcissus and may not, or only with much hesitation, attack another host plant. On the other hand, a population feeding on this latter host will not go to narcissus. Such observations have been made frequently on various species of plant-infesting nemas. (Figs. 130 and 131.)

FIGURE 130.—Diagrammatic sketch of the behavior of a population of the root-knot nema which came from a greenhouse where lettuce had been grown continually on the same soil for some time. The nemas developed such a preference for lettuce that tomatoes were not, or only slightly, attacked. (The figure shows the results of an experiment with this population. In this pot with heavily infested soil ten times more nemas attacked the lettuce than the tomato.) Yet the latter plant is usually conceived as one of the most susceptible and easiest attacked. This illustrates very plainly how a crop planted again and again in the same infested soil is soon destroyed by the rapidly increasing pest

In some parts of Europe potatoes are heavily infested by the sugar-beet nema; in the United States it has not been observed on this host. A field badly infested with this same pest was planted to barley, which is usually conceived to be nonsusceptible. In the first two years no remarkable injury occurred, but in the third year the crop was destroyed by the nema before harvest. Numerous examples of this kind could be added. The explorer Stefansson [10] again and again made the observation that a dog team accustomed to a certain diet (e. g., fresh-water fish or seal meat) would not eat food new to it, and often the dogs preferred to starve. Once he made

[10] STEFANSSON, V. FRIENDLY ARCTIC; THE STORY OF FIVE YEARS IN POLAR REGIONS. p. 61 et seq., illus. New York. 1921.

an experiment and tried to teach his dogs to eat wolf meat. He writes:

The dogs were kept tied in one place and supplied each day with a dish of fresh water. A piece of wolf meat was placed beside the dish every day and allowed to remain there all that day. This meat was then destroyed, for we were afraid it might begin to putrefy and we wanted to see how long the team would go hungry before eating meat that was quite fresh and still retained the full wolf odor. During the second week five of the six dogs gave in one by one, but at the end of the fourteenth day the last dog had not yet touched it. He was the oldest of the team, which was doubtless why he was the most conservative. He had been the fattest of the lot at the beginning of the experiment and at the end of the second week he was practically a skeleton.

Food Preferences of Nemas

These observations are mentioned here because the attitude that plant-parasitic nemas exhibit toward plants new to them as food is similar to the one these dogs took to meat new to them. The plant species that has been a host for generations is seemingly preferred and

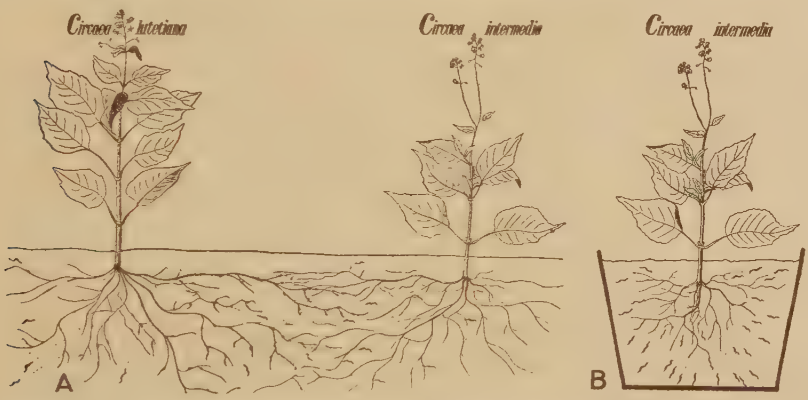

FIGURE 131.—Diagrammatic sketch of the behavior of another population of the root-knot nema. In A, two closely related species of plants are growing together; their roots are mixed and cross over. Yet the nemas were found only on the roots of one of the species, *Circaea lutetiana*, which they all seemed to prefer. Soil with infested roots was then taken, put in a pot, and a specimen of the avoided *C. intermedia* planted. B, Having nothing else to feed on, the nemas accepted this new host with some hesitation. (After a figure published by the author in Phytopathology, vol. 15, p. 506, 1925)

is most easily recognized and most quickly located. Apparently this preference becomes more pronounced the longer a population lives on a certain host plant. That is one reason that a soil, if once infested and then planted again and again to the same crop, will become unfavorable for that crop; but this behavior is also used as a basic principle for various control methods, one of which is the trap-plant method. Infested soil is planted to a preferred host (the seeds should be cheap, the plant of easy culture and quick growth). After the plants are well infested, but before the nemas have had time to mature, the crop is destroyed (by plowing and exposure to the sun, by chemicals, etc.). This method reduces the number of nemas, but it requires labor and needs rather careful surveillance as to the proper time of crop destruction.

However, the main control method, based on the principle of host preference and host specificity of noxious nemas, is crop rotation. These pests should never have an opportunity to adapt themselves to

a given crop and then multiply rapidly to billions and billions. Crop rotation prevents this. The nemas will most often hesitate before they attack a new host; meanwhile the crop gains time, or, if immune crops are used, the nemas will starve.

Crop Rotation the Best Preventive

Crop rotation is the best mode of prevention. If a nemic disease should by any means contaminate a soil (by infested seeds, infested nursery stock, which has undoubtedly been one of the main factors in the spread of nemic pests, tools and implements with adhering infested soil, dirty shoes, irrigation water, etc.), crop rotation may prevent its establishment. But if the pest is already established, crop rotation is one of the best means by which a soil can be cleaned. Whereas other methods involve expense, this sometimes can be made a paying proposition. It will not destroy the beneficial organisms; the texture and nature of fertile soils are not damaged; and the plants are not injured, as is often the case after a chemical treatment. Eventually, green-manuring crops or cover crops may be used.

In case an established infestation is to be controlled, these rules should be followed wherever possible:

In no instance use biennial or perennial crops if they are not known to be absolutely immune. Never plant on infested soils orchards or groves of plants not known to be absolutely immune.

Choose preferably immune crops for the rotation scheme.

If host plants have to figure in the rotation, choose those that are known to be the least susceptible or use the ones that seem to be botanically the most different from the crop most seriously attacked. In no case choose crops of the same family as those which suffered severely unless they are known to be absolutely immune.

Use, if possible, quick growing and quick maturing rotation crops.

Preferably place the susceptible crops in the rotation scheme in that season of the year which is least suitable to the species of nema involved.

Try to give the crop a good start before the active season of a nemic pest arrives.

If satisfactory results are to be obtained from rotation, remember that it is absolutely necessary to keep the weeds out. Experience has shown again and again that weeds make null any attempt to control certain nemic pests by crop rotation. Usually the same weeds come up season after season. Only too often are they also attacked by noxious nemas, especially if no other suitable host is present, and carry the pest over any length of a rotation period.

Crop rotation is the cheapest and most practicable preventive and control measure that is known.

G. Steiner,
Senior Nematologist, Bureau of Plant Industry.

NITROGEN is Fixed in Nature Almost Wholly by Microorganisms Nitrogenous compounds are found in nature largely as constituents of organic matter and to a lesser extent as inorganic salts, such as nitrates and ammonium compounds. Most of the combined nitrogen is found in the upper layers of soil, where plant residues accumulate. A considerable portion is also present in living plants and animals, most of which originally came from the soil and will be returned to this medium when these organisms die. Coal, likewise, contains nitrogen in organic forms which was stored up by plants and removed from circulation in nature ages ago. In addition, there are a few natural deposits of nitrates scattered over the earth's surface, but for the most part limited

to Chile. The total of all of these sources of combined nitrogen is comparatively small and would soon be used up were it not for the fact that nature is constantly replenishing the supplies. In fact, all the combined nitrogen found on the earth presumably existed at one time as free nitrogen gas in the air.

The emphasis placed upon nitrogenous compounds in fertilizers, and upon fixation methods, may not seem justified in view of the fact that nitrogen is only one of several chemical elements necessary for normal plant growth. Nitrogen, however, stands out as particularly important. Not only are nitrogenous compounds deficient in most soils, expensive to supply, and difficult to retain, but they play an exceedingly important part in plant growth. Life itself is dependent upon this element.

Two Methods of Natural Fixation

There are, so far as known at present, only two methods by which nitrogen is fixed to any appreciable extent in nature: (1) Electric discharges in the atmosphere result in the fixation of about 1 or 2 pounds of nitrogen per acre annually; and (2) various nitrogen-fixing microorganisms, either living alone or in combination with higher plants, are found rather generally distributed in soils and water. These organisms account for most of the nitrogen fixed in nature. We do not as yet know the mechanism of the fixation processes used by these lower plants; we do not have a very accurate idea of how much nitrogen is fixed yearly; nor do we know all of the plant species which are able to utilize free nitrogen.

Three types of lower plants have been shown definitely to possess the ability to live on media containing no form of combined nitrogen, utilizing air nitrogen as the sole source of supply. These comprise several strains of bacteria, one group of fungi, and certain species of blue-green algae. Frequent claims have been made that other plant species, including higher green plants, possess this power of nitrogen fixation, but these claims have not been generally accepted. Some workers even claim that nitrogen fixation is a property of most or all plant life, which manifests itself in varying degrees in different organisms. This is, however, an extreme viewpoint for which there is no definite proof.

Two Groups of Bacteria Concerned

There are two groups of bacteria concerned in nitrogen fixation, the free-living or nonsymbiotic forms, which are found in practically all soils, and the symbiotic or legume-nodule bacteria, found living in soils and in the root nodules of leguminous plants. The nonsymbiotic bacteria use the decaying plant and animal residues as energy sources for growth and fixation. Most of these species prefer the well-aerated soils, but some thrive in the absence of air. The quantity of nitrogen fixed per acre per year by these forms is not known but has been variously estimated at 5 to 40 pounds for various soils. Any estimate that may be made can be only an approximation because our information is limited largely to laboratory studies and does not include actual field data. Frequent attempts to increase crop yields by inoculating soils with these bacteria have for the most part given negative results. The general recommendations for increasing nitrogen fixation by these organisms are to apply sufficient lime to keep the soil from becoming

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acid, maintain the organic matter by returning all crop residues, and add phosphates and potash, if needed. Fortunately, all of these recommended practices are the ones commonly followed in good farm practice.

The legume-nodule bacteria are normally found widely distributed in soils. However, there are several strains of these, and no given strain will inoculate all species of legumes. If a legume is grown on a soil that has previously produced good crops of the legume, usually the plants will show nodules without inoculation. The addition of the bacteria is always advisable unless it is definitely known that the soil is already satisfactorily inoculated.

Fixation Capacity of Legumes

Recent work has shown that there is a difference in the nitrogen-fixing capacity of various strains of the nodule bacteria; hence, inoculation may sometimes prove profitable even though the soil already contains the bacteria. The quantity of nitrogen fixed per acre of legumes in a year commonly varies from 50 to 200 pounds. Present information indicates that neither these bacteria nor the higher plants alone fix nitrogen, but both must work together. Hence, the quantity of nitrogen fixed on a given soil will vary with the vigor of growth of the leguminous plant; likewise, with the quantity of available nitrogen present in the soils. Where plenty of fixed nitrogen is present leguminous plants fix little, but where the supply is very limited the plants, which are well supplied with nodules, secure practically all from the atmosphere. In general, then, with the exception of soil-nitrogen supply, the soil conditions which favor plant growth likewise favor nitrogen fixation.

The second type of microorganism which has been shown to fix nitrogen is the fungi or molds. Numerous studies with these organisms have shown that probably only two strains can fix nitrogen. Their importance from the standpoint of nitrogen fixation is not great.

The third group of nitrogen-fixing plants is the blue-green algae, commonly found as green scums on ponds; also in soils and sea water. Their economic importance is not known, in fact it was only during the past year that workers in Germany and in the United States Department of Agriculture, working independently, definitely proved that these green plants can use free-nitrogen gas.

Much Research Done on the Problem

A great amount of research has been conducted, particularly during the past 50 years, to determine nature's methods of using free-nitrogen gas. The aim of these studies, other than scientific interest, has been (1) to determine the plant species which can use nitrogen gas, (2) to find out how to use these natural methods to increase crop production, and (3) to develop commercial methods for supplying various nitrogenous salts at will for use as plant foods and in the industries. The success of commercial fixation methods is well known; nitrogenous compounds may be prepared from atmospheric nitrogen now at will in any quantity desired. However, we still rely on nature for approximately 90 to 95 per cent of our annual requirement. Our aim should be to encourage nature by keeping the soil in proper condition for vigorous nitrogen fixation by free living organisms and to grow as

many leguminous crops as farm practice will permit. We may then supplement nature's sources of nitrogen supply with commercial-fixation products to bring the level of crop production to any practical limit desired.

F. E. ALLISON,
Senior Chemist, Bureau of Chemistry and Soils.

NITROGEN'S Functions in Plant Growth Make Cheap, Ample Supply Essential Nitrogen is probably the most important element, all factors considered, with which we are concerned in agriculture to-day. In the gaseous form it constitutes approximately four-fifths of the atmosphere, but it is only after it has entered into combinations with other elements that it becomes a food material for most plants. In forms such as ammonia, nitrates, and various organic combinations it is indispensable for the existence of all forms of life. The great emphasis that has been placed on securing adequate and cheap sources of fixed nitrogen for agriculture and the industries is, therefore, justified. Constant cultivation has brought about a depletion of the supplies by removal in crops, by leaching, and by escape to the atmosphere in gaseous forms.

In addition to water the chief constituents of most plants are proteins, carbohydrates, and fats. In addition, there are many other compounds such as organic acids, pigments, essential oils, etc., which are found in varying percentages. Other than the mineral constituents found associated with these materials, nitrogen is the only element necessary for the synthesis of these substances which is not readily obtained from air and water by higher plants. The energy needed for the building-up processes is supplied by sunlight through the agency of chlorophyll. Nitrogen is especially needed in the synthesis of proteins, it being present in these substances to the extent of about 16 per cent. Proteins in combination with nucleic acids constitute the most essential part of protoplasm, the material found in all living cells and in which the life processes center. Growth, reproduction, and repair all depend upon proteins and in turn on nitrogen. Chlorophyll also contains nitrogen, and hence even the ability of plants to use the energy of the sun in building up carbohydrates and fats is dependent upon this element.

Since the primary function of nitrogen in plant tissues is in connection with growth and reproduction naturally the portions of the plant where these processes are most active are relatively high in this element. In the early stages of growth leaves and growing tips are very rich in nitrogen; later, as maturity approaches, the proteins are transported largely into the seeds.

Nitrogen Makes Leaves Green

The effect of an abundance of nitrogen is not only to produce heavy growths of foliage but almost invariably the leaves exhibit a deep rich green appearance. Conversely, nitrogen starvation results in stunted growth and a decided yellowing of the foliage. An excessive supply of nitrogenous compounds in the soil may in rare instances result in such an exceedingly rank growth of stems and leaves as to be somewhat

harmful. In such cases the plants are less hardy and more easily attacked by diseases; in addition, maturity may be delayed to such an extent as to decrease the yield through injuries by frost. If the crops have sufficient time to develop to maturity, an extra large production of foliage may not be harmful because the surplus food materials are largely transported to the seeds or other storage organs. These remarks, of course, do not apply for crops grown for their leaves.

The practices to be followed in the application of nitrogenous fertilizers should conform with the ideas presented above. Nitrogen is needed particularly for early growth; hence, it should be applied to spring-sown crops chiefly at the time of planting. In the case of cabbage, lettuce, hay crops, and other crops grown for their foliage the rate of application may be relatively high. If the growth period for such crops is short, one application may be sufficient; otherwise subsequent top dressings may be profitable. Where a continuous growth of succulent leaves is desired, as in the case of pastures, frequent applications are advisable if economically feasible.

Nitrogen for Small-Grain Crops

Where nitrogen is needed in moderate amounts, as for grain crops, early single applications are most commonly used. This application should be made at about the time of seeding for corn; small-grain crops usually respond best to early spring applications, but this will vary with the crop, time of sowing, available moisture, and numerous other factors. It is always wise to consider the fertilization program in relation to the available soil-nitrogen supply. In the early spring this supply is very low, but as the soil warms up the organic matter is gradually converted into nitrates. In the better soils this nitrate supply is usually adequate to care for the crop demands throughout the hot summer months. It is during the early spring months that this natural supply is very deficient, and this explains why market gardeners commonly secure such excellent results with heavy applications of nitrates in the early spring. Whatever the practice followed, so far as nitrogen is concerned, it is necessary to bear in mind that most soils also require phosphorus and potash; hence a complete fertilizer is usually more profitable than nitrogen alone.

F. E. ALLISON,
Senior Chemist, Bureau of Chemistry and Soils.

OATS of Fulghum Variety Win Place in Southern States

Most oat varieties grown in the United States have been introduced from foreign countries or have originated as selections from introductions. The Fulghum variety, however, is the one outstanding exception. It is distinctly American in that no variety like it is known in any other country.

The variety originated a few decades ago as a plant selection from a field of Red Rustproof on the farm of J. A. Fulghum near Warrenton, Ga. It probably resulted from a natural cross between Red Rustproof and some other variety. Such field crosses are not uncommon. From this beginning Fulghum has spread throughout the southern half of the United States and become one of the most important varieties.

Fulghum was first grown as a fall-sown variety in southeastern Georgia. It did not become of importance as a spring-sown variety until about 1920. In recent years it has attained its greatest usefulness for spring seeding in that area lying between the great spring-oat belt of the North and the winter-oat belt of the South. Fulghum has proved so well adapted as a spring-sown variety in this area that a new and rather definite oat belt is indicated. Growing this variety has made oats a much more certain crop than formerly in this area.

Fulghum, like Red Rustproof, is a so-called red oat. Red oats usually are considered to be descendants of the wild red oat (*Avena sterilis* L.), which is supposed to have originated in the Mediterranean region of southern Europe. Wild red oats still may be found growing in that portion of Europe and in northern Africa. This offers an explanation for the suitability of cultivated varieties of red oats to the southern portion of the United States.

Fulghum differs from Red Rustproof in being from a week to 10 days earlier. Fulghum usually grows a little taller than Red Rustproof and produces slenderer kernels with fewer awns and basal hairs. The peculiar horseshoe-shaped cavity at the base of the kernels also is not so large nor so prominent in Fulghum as in Red Rustproof. In the field Fulghum is readily distinguished from Red Rustproof by having more erect panicles (heads). They are small to mid-sized, spreading, and very erect.

Former Varieties Not as Well Adapted

In the area where Fulghum has become the important spring-sown variety the spring seasons often are short and cool. However, sudden changes to excessively hot weather frequently occur, even early in the season. Oats are more susceptible to heat injury than are other small grains, and often are seriously injured by such decided changes. An early, vigorous, and heat-tolerant variety such as Fulghum, therefore, is valuable. Previous to the advent of Fulghum for spring seeding in this area the farmers grew such varieties as Burt (also known as Early Ripe, June, May, etc.), Red Rustproof (Red Texas, Texas Red), or some of the early northern varieties, which are better adapted farther north in the Corn Belt.

Burt, while early and heat resisting, never was entirely satisfactory because of its lack of uniformity. It contains an unusual number of off-type plants, many of which are undesirable. Burt has rather small, slender kernels, of various colors, and usually also is inferior to Fulghum in bushel weight and yield.

The Red Rustproof variety usually is too late for best results in Missouri, Kansas, and Oklahoma. In Kansas, especially, it was grown for many years from spring seeding for want of a better adapted variety. Owing to its late maturity, yields often were reduced by dry weather or other unfavorable conditions. Red Rustproof has not been satisfactory for spring seeding in the territory in which Fulghum has become the dominant variety.

The northern or common oat varieties never were altogether satisfactory in the southern part of the Corn Belt. In seasons when cool weather continued until well into the spring fair yields were obtained, but slightly delayed seeding or early hot weather often resulted in light, poorly filled grain.

Fulghum and Its Strains Replace Other Varieties

The acreage devoted to oats in the principal red-oat producing States was about 8,000,000 acres, according to the 1919 census. It is estimated that probably 5,000,000 acres were of spring-sown red-oat varieties. Since 1919 the acreage sown to red oats has increased considerably in Kentucky, Missouri, and Kansas, and in the southern parts of Ohio, Indiana, and Illinois. It now is estimated that upward of 7,000,000 acres are devoted to spring-sown red oats. A large percentage of these are Fulghum or its strains, of which Kanota is one of the most important.

The possibilities of Fulghum for spring seeding were first recognized by the Kansas Agricultural Experiment Station, where the strain later named Kanota showed considerable promise in the early experiments conducted by that station. Kanota was first distributed to farmers of Kansas in 1919, and in 1926 it was estimated that over 1,000,000 acres of the variety were grown in Kansas alone. Fulghum or Kanota also is grown rather extensively in Missouri, Oklahoma, and northern Texas, and to some extent in the southern parts of Ohio, Indiana, and Illinois, Iowa, and Nebraska, and in eastern Colorado.

Frazier is another strain of Fulghum. It was developed at substation No. 6, Denton, Tex., by the Texas Agricultural Experiment Station for February seeding in northern Texas. Frazier is very similar to the original Fulghum, but usually produces more awns than the parent variety.

Disadvantages of Fulghum

Although the discovery of the value of Fulghum for spring seeding has proved of economic value to oat growers in the central spring-sown red-oat area, the variety has several deficiencies.

So far no strain of Fulghum has been found which resists stem rust (*Puccinia graminis avenae*), and none which has given evidence of resistance to crown rust (*P. coronata*). Practically every year both rusts influence oat yields in the area. Formerly it was believed that Fulghum was resistant to, if not immune from, the loose smut (*Ustilago avenae*) and covered smut (*U. levis*) of oats. Recently it has been discovered that Fulghum is not resistant to all physiological strains of these smuts. Efforts are being made by the United States Department of Agriculture, in cooperation with several of the State agricultural experiment stations, to develop strains of Fulghum resistant to these diseases.

Satisfactory control of smuts may be accomplished rather easily by treating the seed with formaldehyde.

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F. A. Coffman, *Associate Agronomist,*
Bureau of Plant Industry.

PAPAYA Growing in South Florida Has Made Some Headway If you are weary of the routine of grapefruit or orange juice with your breakfast and have a taste for adventure, you might ask your fruit man at the market for a papaya. He may look puzzled and protest there is no such fruit, but he should know better and recognize that the tropical papaya is an admirable substitute for the melons that it somewhat resembles and a pleasant variation from the citrus fruits.

The papaya belongs to a genus of about 20 species which are native to tropical and subtropical America, with the common species (*Carica papaya*) occurring naturalized through the keys and hammocks of Florida. The plant has been carried about the world, however, until it is now known throughout almost all tropical regions. All the species are of rapid growth, making unbranched trees up to 25 feet in height which are of striking appearance with large leaves and abundant melonlike fruits borne in the axils of the leaves along the upper part of the trunk, giving the plant a singular and characteristic aspect.

The problems of the cultivator are several. The first one, and that which has caused the greatest difficulty in the selling of the crop, is the difficulty of establishing a strain of fruits that are of high and uniform

FIGURE 132.—Commercial planting of papaya

quality. The papaya produces three types of plants bearing respectively staminate, pistillate, and perfect flowers. The first are useless for fruiting, and the second must be pollinated by male or by perfect flowers.

Since papayas are still commonly grown from seed, it is necessary that a strain be developed which shall produce a high percentage of perfect or pistillate flowers. Such a strain has been in existence for some time in F. P. I. No. 28533, which was introduced from the Canal Zone in 1910 and has been largely used in Florida. This strain has the further advantages of uniformity of fruit size and quality as well as good shipping characteristics.

Its Culture Has Many Perils

It seems unfortunate that a plant with so many possibilities for culture in southern Florida should be surrounded by so many perils, but perhaps these are no more than beset the peach or the pear. Being

strictly tropical, the papaya must be grown out of the reach of freezes. It can not stand flooding or a high water level. It requires a constant supply of moisture. On sandy lands it is subject to root knot, but it can be managed there as an annual crop. Its leaves may be attacked by a leaf fungus, but this can be managed by sprays. The pickle worm, the papaya fruit fly, and now the Mediterranean fruit fly must all be considered as possible enemies. The latter damages the fruit chiefly at the time of ripening, and this may be circumvented by bagging and by good technic in ripening fruits off the tree. This technic has not been entirely worked out as yet, so that some fruits reach the market in a condition really unfit for eating.

The important thing for the papaya at this time is a recognition of its value as a fresh fruit maturing at a season when melons are not available except by import or greenhouse cultivation. While the papaya is in no sense a substitute for melons, it can be eaten much as they are, cut in half and chilled. The rinds are thin, and the fragrant tender flesh is eaten as is that of the muskmelon. The crops mature from December to March, with scattered production thereafter. This later ripening fruit may be used locally for the production of marmalade, which is of a rich, deep, honey-yellow color and delicious flavor and should provide in time another variation among the marmalades now made from various familiar fruits.

FIGURE 133.—Fruiting habit of papaya

In other countries the green fruits are used boiled, much as we use summer squash, and the leaves, particularly those of *Carica quercifolia*, are boiled with meats to soften them by the reported action of the papain content. In Ceylon the green fruits are scored and the milky latex which exudes is collected and dried to form the papain of the pharmacopoeia. Whether the papaya will become so fixed a member of our American orchards as to furnish not only winter fruits but vegetables and medicine as well remains to be seen, but in any case the interest in raw foods, both fruit and vegetables, that is now current should be extended to include the papaya, and no initial strangeness should prevent the purchaser from learning to like it any more than the occasional poor muskmelon dims one's hope of a really excellent specimen.

KNOWLES A. RYERSON,
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PAPER Mulch Use in Ornamental Plantings Has Proved Effective The introduction of paper mulch into agricultural practice in the United States has been followed by the demonstration of its effectiveness with a wide variety of crop plants over an extended area. The process consists essentially in covering the ground around the plants with suitable paper. As yet the cost of the paper does not appear to permit its general economic use with crops having a low value per acre, but in the culture of an appreciable variety of specialized crops paper mulch seems well on its way toward becoming an asset in crop production. Its use in the home garden is extending rapidly, where, with increasing familiarity with the method, it is giving results in satisfaction out of all proportion to its cost.

FIGURE 134.—Roses in the third season with paper mulch. Pine needles serving as a naturalistic covering. Aurora Hills, Va.

Although the chief interest in paper mulch centers about its use in the production of crop plants and crops, the effectiveness of the paper with other plants has been widely attested. The use of paper mulch in ornamental plantings about homes and in estates and parks is being followed with interest as a possible extension of the practice. In the production of young evergreens, flowering shrubs, and annual and perennial flowering plants of various sorts it has been of decided advantage from the standpoint of growth response and weed suppression. Just as in the case of crop plants, these results have been obtained under a variety of seasonal and soil conditions, and it appears that growing experience with the process may permit many producers of flowers and ornamental plants to make extensive use of it.

Esthetic Effects with Ornamental Plantings

Ornamental plantings from the cultural standpoint are roughly of two sorts—the plantings reestablished every year and the more or less

permanent plantings of hardy perennial plants. For the annual plantings the papers of what is known as type A appear quite suitable, while for the permanent plantings papers of type B are indicated. The use of paper mulch for ornamental plantings appears to have the same advantages of plant stimulation and weed suppression that it has for crop plants, and likewise the same disadvantages related to cost and application. In addition, with ornamental plantings the use of paper mulch has an uncertain esthetic effect. Its artistic value in ornamental plantings depends on the point of view and the basis of comparison. In the home vegetable garden the paper establishes an alignment of plant rows and creates an impression of order and neatness that is generally pleasing. In the ornamental garden the appearance of the paper depends a great deal on the neatness with which it is laid and the sizes of the plants being treated. In many cases it is not objectionable when so used, but if found so, naturalistic coverings may be advantageously applied.

Methods of Applying Paper

Ornamental plantings of herbaceous annuals and perennials, whether formal or naturalistic, lend themselves readily to the use of paper mulch. Field seeding may be accomplished through the paper by means of a small dibble, or the smaller seeds may be drilled in between adjacent strips of paper as with field-seeded plantings of vegetables.[11] When plants are grown from seed between strips of paper, however, special precautions must be taken not to delay any necessary hand weeding, since the weed growth is similarly stimulated if given an opportunity to develop. In seeding through the paper by means of a dibble the weed competition is less serious.

In establishing ornamental plantings of herbaceous annuals or perennials by transplants the smaller plants are usually set through the paper with a suitable dibble. In some cases in which large plants were used they were first set into the bed and thoroughly watered, after which the paper was fitted to the soil space about them with some overlapping. The paper as used in formal plantings may be held in position by soil placed over the outer edges, when the size of the beds permits, or it may be held with wire staples. When paper is fitted about the larger plants set out into beds it is usually held with wire staples through the overlaps. As used in all informal plantings, the paper is also held with staples.

In making ornamental plantings of woody perennials, whether formal or informal, the plants are usually set out and watered thoroughly, after which the paper is applied to all exposed soil, usually being overlapped and held with wire staples. In establishing hedges and formal borders with such plants, however, a strip of paper is first laid and notched along one side at the desired intervals. The plants are then set in at these intervals, after which a second strip of paper is laid to overlap the planting edge and is held with wire staples. The outer edges of both strips may be held with soil or with staples, and when used in this way a straight-line planting is assured.

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[11] The method is described in: FLINT, L. H. SUGGESTIONS FOR PAPER-MULCH TRIALS. U. S. Dept. Agr. Circ. 77, 8 p., illus. 1929.

Practice of Some Nurserymen

Some nurserymen have adopted the practice of applying paper mulch about woody plants after transplanting and following copious watering in their permanent location. Similar use has been made of paper mulch in the planting of young shade trees along highways and in estates and parks. In these instances, however, perhaps the greatest importance has been attached to the effectiveness of the paper in aiding the plant to establish itself in new surroundings, and through such use it is evident that the survival of the plant is less dependent upon subsequent attention than would be the case in the absence of the paper. In such special and temporary instances the unsightly appearance of the paper may possibly be disregarded, but as a permanent accessory to ornamental plantings the black surface is not generally pleasing.

FIGURE 135.—Young rhododendrons in ornamental planting treated with paper mulch. Pine needles used as naturalistic covering. Aurora Hills, Va.

Naturalistic Covering

As previously indicated, the artistic value of paper mulch applied to ornamental plantings is variously appraised. In both the annual and permanent plantings the paper when neatly laid is frequently pleasing in appearance without additional naturalistic covering, and in many cases fast-growing plants will soon obscure the paper in any event. When the appearance of the paper does not seem satisfactory, however, various materials may be applied to the surface of the paper. The commonest of these materials is soil, and when the beds are fairly level a layer of soil placed on the paper may be satisfactorily retained. When thus applied the soil also holds the paper so that wire staples may be unnecessary. In some cases surprising results have been obtained with vegetables and flowers when the paper was completely covered with soil in this fashion, but ordinarily from a standpoint of plant response alone the black surface of the paper is a distinct asset.

Other materials which have value as naturalistic coverings for paper mulch in ornamental plantings are pine needles and peat moss. The

pine needles are available in rather limited and decreasing areas, but may be preferable to soil both in appearance and in resistance to washing, especially on sloping areas. The use of pine needles as a naturalistic covering for paper mulch with ornamental plantings is shown in Figures 134 and 135. The area in roses shown in Figure 134 had been mulched for two previous seasons with type B paper. The covering of pine needles was subject to some disintegration during the winter, requiring a supplementary top dressing in the spring. The area in rhododendrons shown in Figure 135 had been mulched the previous year with type B paper.

In many regions it is a common practice to spread a layer of peat moss on the soil as a mulch about ornamental plantings. The moss conserves moisture, reduces weeds, and makes an attractive soil covering. Paper mulch has been effectively used previous to the application of peat moss in such plantings, where it increases the moisture and suppresses weeds more efficiently than does the moss alone. Peat moss in bales is readily available in the floricultural trade.

The application of naturalistic coverings to paper mulch without doubt reduces the absorption of solar radiation, but the advantages of moisture retention and weed suppression remain, and these may often be so appreciable as to make the practice well worth while. Some attention is being given to the manufacture of mulch paper more attractive as a background for ornamental plantings than the black paper, but as yet no such papers are available.

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PART-TIME Farming Is Common in Alliance With Rural Industries Europe is well aware of the economic and social advantage of the skillful dovetailing of small farming with rural industries. North America is slow in recognizing this advantage. Yet it is becoming evident statistically that part-time farming in the United States is a fact to deal with; that many a small American farmer is already looking to various rural industries to help him make a living; that many other small farmers have idle time. This suggests that a well-considered plan of developing better relations between rural industries and small farming will assist both agriculture and industry.

Much industrial work other than farming is already done by farm people. Some data on this subject are given in the 1920 census of farm population. The farm population of eight regionally representative counties, numbering 188,285 farm people, was tabulated with respect to persons gainfully employed. It appeared that 70,783 persons 10 years of age and over were gainfully employed in all occupations, and that 7,538 of these were gainfully employed in nonagricultural occupations. These nonfarming occupations included mining, manufacturing, transportation, retail trade, public service, professional service, clerical and domestic service, mail carrying, telephone operating, school-teaching, nursing, laundering, bookkeeping, stenography, millinery, and dressmaking.

These figures give some assurance that there is economic and social fitness in the alliance of farming with industry. Special recent studies of the Department of Agriculture throw further light upon the matter.

On 500 farms in southeastern Ohio and in the mountains of Kentucky, the operators on virtually half the farms—nearly all small farms—worked only part of the time at farming, the rest of the time being given to labor off the farm. At nonfarming work these farm operators made on an average as much cash income as the farm itself yielded. They worked in railroad shops, in coal mining, at carpentry and painting, in sawmills, on roads, hauling, in grain elevators, buying and selling livestock. But even with these outside sources of income, the material standard of living of the operators on small farms was not more than half that on the large farms of the Nation.

Evidently the part-time farmer in question is engaged from necessity, not from pleasure, in something besides farming, but apparently he prefers this manner of living to any other within his reach. His family has the benefit of living on the land. He can raise a family on a modest income. The land gives work to his children in a manner that is not harmful to them. He has the proverbial freedom of the countryman. The near-by work off the farm fits precisely into this type of farming. But the fact that the outside work is near by is more or less accidental; and part-time farming is accordingly precarious. National or State action to make this situation more secure and to stabilize the alliance between part-time farming and rural or urban industries, would seem to be in order. Certainly there is need for more information.

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PASTURES Have a Wide Variation in Feeding Value for Livestock Although the value of pastures has long been recognized and studied by investigators, there has recently been a renewed interest in the subject. Such developments in nutrition as the necessity for vitamins, the importance of mineral salts, and the effects of deficiencies of these food factors furnish a broader basis of study than previously existed. Pasture grasses are particularly good sources of vitamins, minerals, and in many cases a high grade of protein.

Inquiry has been extended into the nutritive value of pastures, the deficiencies that may occur in them, and means of increasing their value by the use of well-selected feed supplements, on the one hand, and the enrichment of the soil and pasture management on the other. The nutritive value of pasture is subject to considerable variation. The pasture may consist largely of one type of grass, such as bluegrass, or of a variety of grasses and legumes. Climate, soil, and grazing affect the distribution of plants.

Closeness of Grazing Affects Value of Pasture

Different stages of plant growth greatly modify the nutritive value of pasture. Young grass, consisting largely of leaves and comparatively little stalk, is richer in protein and soluble carbohydrates and is more readily digestible than older grass in which more stalks have developed. These conditions point to the proper method of utilizing pasture. The grass of a pasture grazed sufficiently close to keep the young leaves growing and to prevent the development of too much

stalk has a higher feeding value than one in which the stalks are allowed to develop. The relatively high protein content of the leaves of young grass and the high nutritive value of the proteins indicate that the supplement needed for young and closely grazed pastures is a relatively high carbohydrate feed, such as corn, rather than high protein supplements. British investigations show that complete grazing once in three weeks during a good growing season is sufficient to maintain the high nutritive value of a pasture.

The season, particularly the quantity and distribution of rainfall and the temperature, has a considerable influence on the composition of pastures. Seasons of heavy rainfall stimulate the growth of grass whereas dry periods retard it. Seasonal variations then become problems that must be met in the utilization of pastures.

Livestock Health Depends on Certain Minerals

Enrichment of the ground with fertilizer has a marked effect on the rate of growth and composition of grass. The poor development of livestock and certain clinical symptoms shown by them have been traced in many cases to mineral deficiencies in the soil and plants. Although these deficiencies in most cases may result only in retarded growth of the animals, in others they may be sufficiently great to result in definite symptoms that may be characterized as disease. An example of such a condition is a deficiency in phosphorus. In animals grazing this kind of pasture the chief symptoms are a morbid appetite, stiffness of joints, and a staggering gait. The animals may eat such substances as dirt or bone. In such cases the disease has been checked or cured with the administration of bone meal or sodium phosphate or by a shift to a pasture known to contain sufficient phosphorus.

In some parts of the country the vegetation is deficient in iodine, and the lack of this element causes goiter and often hairlessness of the new-born young. These effects are largely corrected by including in the rations a feed containing iodine. Pastures low in calcium have been held to be the cause of the maldevelopment of the bones of horses. A close relation between the mineral content of pasture and the development and stamina of horses has long been recognized. Recent research has indicated also the relation between certain mineral constituents, such as copper and possibly manganese, and the utilization of iron by animals.

These examples illustrate not only the possible deficiencies that may exist in pastures, particularly those that have been overgrazed or long used or are in unusual geological situations, but also the value of pastures as a source of mineral elements. Add to this the high nutritive value of the protein they afford and it is evident that the high regard in which pastures are held by livestock men is justified.

Paul E. Howe,
Senior Biological Chemist, Bureau of Animal Industry.

PEPPER Weevil has Spread Steadily in Southern California

The pepper weevil, *Anthonomus eugenii* Cano, an insect which closely resembles the cotton-boll weevil in appearance and in feeding and breeding habits, was first found injuring peppers in this country in southern Texas in 1904. Like the cotton-boll weevil, it is supposed to have come from Mexico.

It is now known to occur within the United States in Texas, New Mexico, and California.

Discovered in southern California in 1923, when growers of bell peppers in Los Angeles County suffered considerable loss, this serious pest of the pepper crop has spread gradually until at the present time all of the pepper-growing districts of the southern part of California, with the exception of the Coachella and Imperial Valleys, are known to be infested. Fortunately the damage to the crop has not been severe every year. These yearly fluctuations in infestations are governed largely by climatic conditions which prevail during the winter period. During mild winters the pepper plants remain partially green throughout the winter months, thus providing food for the insects, with the result that the next year's crop of peppers is subject to a heavy infestation early in the season from the brood of weevils which had an opportunity to develop in the old pepper fields.

The greatest damage to the pepper crop since the discovery of the pest in California occurred during the season of 1926. The winter preceding this season was unusually mild, and a great number of pepper plants remained green throughout the winter. The over-wintering weevils survived on these plants in large numbers, and a brood had developed by the time the new pepper crop had reached the budding and bearing stage. This was followed by such an abundance of the insects by the end of the season that attack upon the flower buds prevented setting of the pods. The loss to the pepper industry in Orange and Los Angeles Counties for that year amounted to about one-half million dollars. The winter of 1927–28 was similar to that of 1925–26, the weevils surviving the winter in even greater numbers than in 1925–26. Extreme losses were in prospect, but the adoption of effective control measures prevented serious loss to the pepper growers.

Principal Damage Done in Grub Stage

Owing to the manner in which the pepper weevil feeds and develops, it is particularly destructive to all varieties of peppers (Capsicum) grown in the United States. The immature forms or grubs feed and develop within the flower buds and pods, and the adults feed upon the buds and pods as well as the foliage. The principal damage, however, is through the feeding of the grub within the pepper pod or blossom bud. Infested pods are revealed first by a shrivelling of the stem and a yellowing of the calyx, the latter sympton being especially characteristic. The infested pods finally turn yellow or prematurely red. The contents of the pod turn black and may become a mass of decayed tissue and frass, the extent of this injury depending on the number of grubs developing in the same pod. Even pods which appear sound may display this condition when opened. Heavily injured pods are generally malformed, but some pods may be injured to the extent of being worthless without giving any external evidence of such injury. Large numbers of the injured pods drop prematurely, and those which remain on the plant and mature are often marred by the holes made by the adult weevils as they emerge from the pod. Feeding or egg punctures in the surface of uninfested pods of the varieties used for canning lower their quality, since the injured areas appear as black spots when the product is canned. Feeding punctures, egg punctures, or developing larvæ within the flower buds may cause them to drop from the plant.

In California the weevil does not hibernate but is more or less active throughout the winter season. During warm periods it feeds upon the pepper plants which have withstood the frosts, and upon the common nightshade (*Solanum nigrum*). The latter plant, which grows abundantly along ditch banks and in uncultivated areas, plays an important rôle in the life of the pest in California, since it provides winter food for the insect, especially when the winters are severe enough to kill the pepper plants remaining in the old fields. The weevil also breeds in the fruits of nightshade.

A Comparatively Long-Lived Insect

The pepper weevil is a comparatively long-lived insect. A single female is capable of depositing an average of 300 eggs. The eggs are laid singly, but a number may be placed in each pod. As many as 20 grubs have been taken from a pod only an inch in length. Upon hatching, the grub feeds within the pod until mature, then changes to the pupal stage, and later changes to the adult stage within the pod, from which the weevil emerges. A brood of weevils will develop from the egg to the adult stage in 20 days under favorable conditions. A maximum of eight broods may develop in exceptionally long seasons, but in less favorable seasons only five broods occur in the field.

Experiments along control lines have shown that the cleaning up or plowing under of all infested pods will serve to cut down the numbers of the insect and thus reduce damage by the pest. Dusting with undiluted calcium arsenate at the rate of 7 or 8 pounds per acre at 7-day intervals has given good results, but this method of control is not entirely satisfactory, because any arsenical residue which remains on the peppers at harvest must be removed. While this can be accomplished readily in cases where the peppers are used for canning, in the case of peppers intended for drying the product must be handled very carefully after washing in order to prevent decay. The frequent use of calcium arsenate throughout the season may indirectly increase aphid or plant-louse infestations through the effect of the treatments upon the natural enemies of plant lice. The destruction of nightshade, the natural winter host of the weevil, may ultimately prove to be an important step in the control of this pest, especially in the more seriously affected districts and when the cultivated peppers are cleaned up after harvest. Experiments are now under way to determine the exact results attending the removal of the nightshade.

J. C. Elmore,
Assistant Entomologist, Bureau of Entomology.

PLANT Literature in World's Current Publications Listed How is the scientific investigator to keep abreast of the mass of material which is pouring from the press? Some short cut must be provided. Abstract or review journals are the ideal means, but these of necessity are late in appearing. The Bureau of Plant Industry Library has attempted to answer the question by issuing two mimeographed lists of current literature on botany and agronomy, respectively. These appear in alternate weeks and give a cursory view of the literature that has been received during the preceding two weeks.

In preparing the botany list the publications first to be considered are the many journals devoted to botany, either to its more technical side or to applied or economic botany, as those of plant breeding, horticulture, and plant diseases. These, however, but partially cover the field, as much of the material on applied botany is found in journals of agriculture and general science. Chemical and pharmaceutical journals must be examined for articles on the chemistry of plants, and such questions as the much-talked-of vitamins often appear in food journals; the journals dealing with perfumery yield articles on essential oils; and still other special journals contain information on fixed oils and fats to be found in plants. Articles on fungicides and wood preservation will sometimes be found in such a publication as Industrial and Engineering Chemistry. A medical journal may contain an article on crown gall of plants or a symposium on virus diseases including plant viruses, or an optical journal, an article on the effect of light on plants.

British Publications Predominate

Among foreign publications those in English predominate because they include journals not only from England proper and Canada but from all the British Empire, including the West Indies, South and East Africa, Egypt, Australia, India, the Malay States, and other smaller scattered colonies. In a half year articles have been selected from 238 publications, 111 from England alone. Here is every range of climate; tropical and subtropical plants, as well as the large crops of so much interest in this country, are dealt with. Australia at the antipodes has many of the same agricultural problems as confront the United States; cotton is one of the large Egyptian crops; and South African plants are always of interest as representing, besides many curious and unusual ones, others like the gladiolus, which is familiar in gardens and important to commercial horticulture. In England itself are investigators whose work is known internationally and institutions that stand for the best in agricultural and horticultural research.

German publications come next, 197 having been examined during the period mentioned. They contain accounts of some of the most important work on plant breeding and crop improvement. Three new journals have come from the German press since the beginning of 1929; one on breeding, one on plant diseases, and one on the plant side of agriculture.

The French journals are third, numbering 142. They are particularly strong in tropical agriculture, as many of the French colonies are in tropical regions.

Many Countries Represented

Then follow publications from a number of countries, ranging from 47 from the Netherlands (including the Dutch East Indies, where among many important investigations those relating to rubber and sugar have particular interest to the United States), 35 from Japan (this number might be enlarged if so many were not wholly in Japanese), and 30 from Italy, to 28 from Russia. In the case of Russian publications, language is a difficulty, and one must be content with those that furnish abstracts or at least titles in familiar languages, or

that can be easily translated; but the work that the Russians are doing in breeding, soil science, and plant physiology can not be ignored.

Another group of publications includes 16 from Sweden, 15 from Switzerland, 11 from Austria, and 10 from Belgium. Next come 7 from Czechoslovakia, 8 from Poland, and 3 each from Peru and Porto Rico, and single representatives from many countries.

All these are journals that have come into the library of the Department of Agriculture in a half year, July to December, 1928, and from which material has been selected dealing with plant science. No account is taken of journals examined which yielded nothing, nor of publications in outside libraries from which articles are taken for permanent record but which are not entered in the list.

During the last fiscal year 7,291 articles were entered in the botany list from 3,034 journals. Of these approximately 800 appeared only once, the remainder being journals appearing weekly, monthly, or at less frequent periods.

The agronomy list draws its material from some of these same journals, but a large number are examined which naturally are disregarded in selecting titles for the botany list. No figures have been compiled for these, but it is safe to say that they would add a third to the number already recorded.

ALICE C. ATWOOD,
Assistant Librarian, Bureau of Plant Industry.

POPULATION Movements Reflect Farm and Business Conditions The yearly movement of population from farms to cities and from cities back to the country appears to reflect the yearly changes in the condition of agriculture and of general business. According to data for the past seven years, an improvement in farm income has been accompanied by a smaller movement of population from farms, and a decline in income has been accompanied by an increased shift to industrial centers. Similarly, the movement from cities to farms has been greater in years of dull business conditions and smaller in years of plentiful employment.

These comparisons demonstrate the importance of the economic factor in determining year-to-year changes in the rate of movement from farm to city and from city to farm. They corroborate the results of a recent survey in which it is estimated that at least 7,500 out of 20,000 reporting farmers gave inadequate income as the reason for leaving their farms. They demonstrate also that the net movement from farm to city—that is, the excess of the movement from farms over the movement from cities—is a reflection of agricultural conditions relative to industrial conditions, and, finally, give evidence of one of the many interrelationships between agricultural and industrial stability.

Sources of the Data

These conclusions are based on the data in the accompanying charts. The average farm incomes used here are those reported by approximately 15,000 farmers throughout the United States for the calendar years indicated and represent the difference between receipts and cash

outlay. The population data are also estimates based on returns from about the same list of reporters. The measure of business activity is the calendar-year index of industrial productive activity as computed by the Federal Reserve Bank of New York. It is used here to represent yearly variations in industrial employment and wage earnings.

If the average farm incomes for the years 1924 to 1928, inclusive, are compared with the number of people leaving farms, a striking inverse relationship is revealed. In line with what might be expected, low farm incomes are accompanied by an increased movement away from farms and higher incomes by a slower rate of movement. (Fig. 136, upper section.)

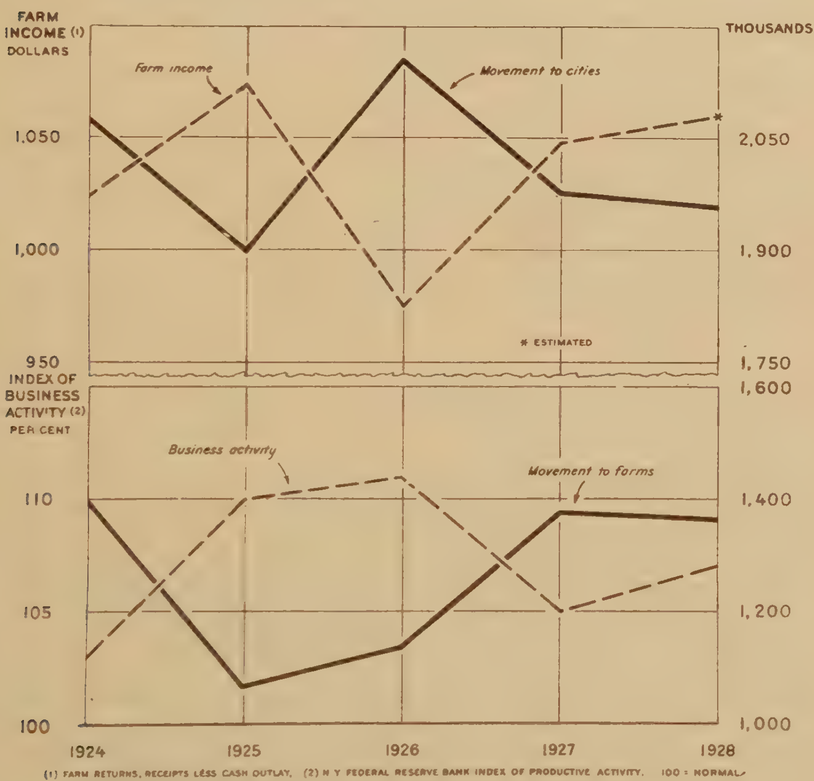

FIGURE 136.—Farm income, business activity, and population movement

A similar comparison between industrial activity and the population shifts from city to country also reveals an inverse relationship. During the years 1925 and 1926, in which industrial employment and wage earnings were relatively high, smaller numbers of people moved to the country, whereas during the years 1924, 1927, and 1928, when business activity was not at as high a level as in the other two years, the movement away from industrial centers was larger. (Fig. 136, lower section.)

These two comparisons tend to establish rather clearly the fact that the yearly variations in population shifts from farms are predomi-

nantly affected by agricultural conditions, and that the variations in the movement from cities are predominantly affected by industrial-employment conditions. (Fig. 138.)

Effects of Good Industrial Conditions

There is some evidence in these data to indicate that the movement from farms may also be influenced by good industrial conditions. For example, the large number leaving farms in 1926 may reflect both the reduced farm incomes of that year and the high rate of industrial activity; and the greater movement from cities to farms in 1927 and 1928 may reflect both the reduced opportunities for industrial employment in those years and the improved agricultural income situation.

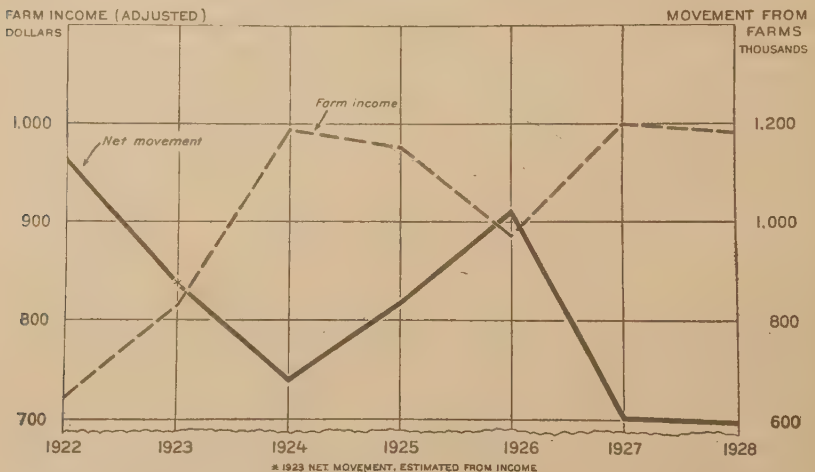

FIGURE 137.—Net movement of farm population and farm income adjusted for changes in business activity. It will be seen that during the past seven years, the cityward movement exceeded the number of arrivals from cities by about 600,000 in 1927 and 1928, and by over 1,000,000 in 1922 and 1926. The fact that a large number of farm people have been moving to cities during the last several years is undoubtedly a result of the generally low financial returns from farming compared with industrial earnings, and the expectation of greater opportunities and better living standards. The yearly variations in this net flow reflect also the yearly variations in farm income

In Figure 137, the net movement from farms is compared with farm incomes, which have been adjusted for the variations in business activity (income divided by index of business activity). The effect of yearly variations in farm income (excluding the effect of industrial conditions) on the yearly losses in farm population is unmistakable. In addition to the year-to-year inverse relationship, there appears to be a reflection of the recent upward trend in farm incomes in the downward trend in the net farm-population movement.

The facts are of interest not only because they show in specific terms that farmers have been moving to industrial centers because farm earnings have not been satisfactory, the rate of movement being slower in years of improved farm returns, but also because they demonstrate one of the many interrelationships between agriculture and business. Population shifts from farm to cities and their causes are factors to be taken into account in plans for industrial stability. Similarly, plans for agricultural stability need to take into account the movement of city population to farms. In years of business recessions,

those who seek employment on farms undoubtedly tend first to reduce the domestic demand for some farm products, and then to increase the supply of farm labor, and probably farm production. Figure 138

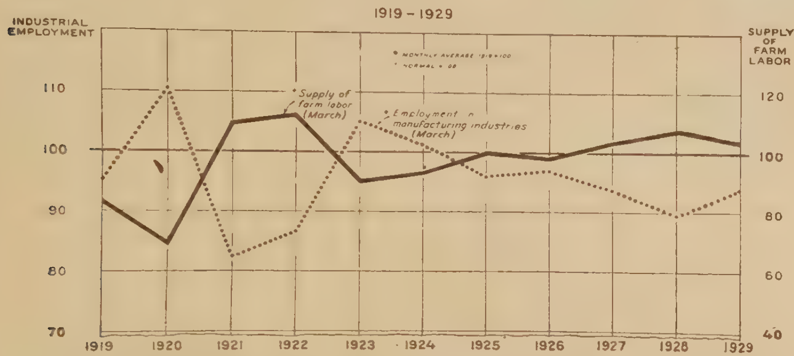

FIGURE 138.—Supply of farm labor and industrial employment

indicates clearly the inverse relation between industrial employment and the supply of farm labor.

L. H. BEAN,
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Bureau of Agricultural Economics.

PORK Firmness is Modified by Feed and Other Factors Firmness of pork is a characteristic of much concern to the hog producer, meat packer, retail dealer, and the consumer. The proportion of fat to lean, its tenderness, flavor, and other characteristics are likewise important, but firmness stands in the front rank. Pork lacking this quality usually suffers discrimination in trade channels.

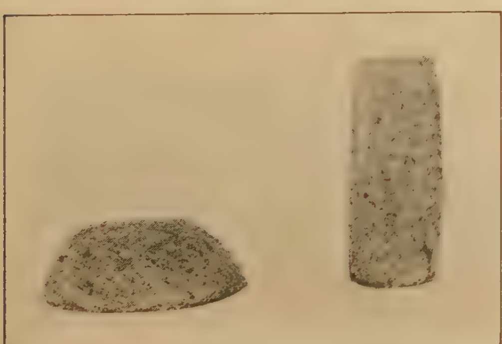

FIGURE 139.—Sausage from oily (left) and firm (right) carcasses. Both kinds of sausage were molded into the form shown by that from the firm carcass. It held its form while the oily sausage slumped down

Research conducted by the department and a number of cooperating State experiment stations during recent years has thrown much light on the factors responsible for variations in firmness. The firmness of a hog carcass and its products depends almost entirely on that of the fat. Thus the factors that influence the character and quantity of fat in the carcass deserve special attention. Feed is the most important factor involved. More specifically, the fat or oil of the feed is usually the constituent causing softness in the hog carcass.

Among the feeds recognized as causing softness in pork, soybeans are believed to be the most important in the United States, because of their extensive production and use in hog feeding. The fat or oil of

soybeans is distinctly softening. When 25 per cent or more of soybeans is fed with corn to fattening hogs the hogs are usually quite soft. In fact, considerably smaller proportions of soy beans often result in lack of firmness. Experiments completed recently showed that 1 part of soybeans fed with as much as 12 parts of corn (or 7.7 per cent of soybeans in a corn-soybean ration supplemented by minerals) to fattening hogs had a definite tendency to produce soft carcasses when the initial weights of the pigs were 100 pounds or less and the daily gain did not exceed 1 pound. When the pigs weighed more than 100 pounds at the beginning and gained 1.3 pounds or more per day on this same feed combination, most of the carcasses were firm.

Striking Variations in Firmness

Finishing hogs on corn and soybeans, grown together and hogged down, has become a common practice in some sections of the country. Research shows that a wide variation in firmness is produced under this plan of finishing, whether supplementary minerals are fed or not. Table 16 gives a partial summary of the results obtained from hogging down corn and soybeans. More than 700 hogs were used in these experiments, and the feeding period in most cases was approximately eight weeks.

TABLE 16.—*Results obtained from hogging down corn and soybeans*

Initial weight (pounds)	Average daily gain (pounds)	Firm carcasses (per cent)
125 or more	1.5 or more	70. 3
Do	1.4 or less	49. 3
111-124	1.5 or more	69. 9
Do	1.4 or less	27. 0
110 or less	1.5 or more	59. 9
Do	1.4 or less	19. 6

FIGURE 140.—Fresh bacon from oily and firm carcasses

As with the dry-lot feeding of corn and soybeans in the proportion of 12 to 1, initial weight of the hogs and rate of gain were important factors also when the two feeds were hogged down. In interpreting these results one should bear in mind that, in general, higher final weights and degrees of finish accompanied the higher initial weights and daily gains. The former are recognized, therefore, with the latter two as factors related to the variation in firmness of carcasses. The feeding of minerals in the corn-soybean ration, in many experiments,

resulted in more rapid and greater gains and to that extent aided in producing the firmer hogs.

Among the feeds in common use in the United States the one possessing the most pronounced softening tendency is peanuts. This feed is not so widely used as soybeans but it plays a very important part in hog production in certain sections of the country. When fed, peanuts usually comprise the basal or principal feed in the ration. This and the further fact that they contain a large percentage of fat or oil—about 45 per cent in the kernel, which is the part consumed by the hog—make the decided, softening effect of the feed easily understood. When hogs are grown or fattened on peanuts, with or without protein and mineral supplements, a high degree of softness develops in the carcasses. In the case of hogs making large gains, the carcasses pass the stage of mere softness and become oily.

Softness From Peanut Feeding Difficult to Overcome

How to harden hogs which were partly finished on a peanut ration has been a problem for many years. Results of recent experiments have shown that this hardening is difficult to bring about. For example, pigs weighing approximately 100 pounds at the beginning of the test and gaining 40 pounds or more on peanut rations have rarely produced firm carcasses even though subsequently gaining 120 pounds on a feed of corn with tankage and minerals. More recent experiments have indicated the advantage of starting and finishing the peanut feeding at lighter weights and of using other feeds in the hardening ration.

Brewers' rice, one of the recognized classes of milled rice, has shown exceptional qualities for producing firm carcasses. In this respect it clearly surpasses corn, which is the standard hardening feed in the United States. Brewers' rice is classed as a basal or principal feed for use in the hog ration. Its composition is characterized by low fat and high carbohydrate percentages. On the other hand, rice polish and rice bran have proved to be softening feeds. Both are used as basal feeds and contain moderately high percentages of fat. However, the hardening requirements of hogs partly finished on rice-polish or rice-bran rations are not so extreme as are those of hogs partly finished on peanut rations.

Mention has been made of certain other factors, in addition to feed, namely, initial weight, rate of gain, final weight, and degree of finish. To these may be added the type of the hog. As previously indicated, softer grades of carcasses are associated with the lower initial weights. This is true with softening, intermediate, and hardening rations when the pigs have previously received no softening feeds. On the contrary, when 50-pound and 100-pound pigs gain 40 pounds on a peanut ration, followed by 120 pounds gain on a corn ration, results have shown that the lighter weight pigs will be somewhat firmer when slaughtered. Under such conditions the lower initial weights lead to greater firmness.

Rate of gain is a very important factor under some conditions. It is especially so with intermediate rations. In fact, except with distinctly softening rations, the more rapid gains generally lead to the firmer grades of carcasses.

Interrelation of Feed and Other Factors

Final weight is an index of degree of finish when dealing with a known type of hog and when the growth and fattening of the animal have been normal. The two must be considered together in a study of factors related to firmness of carcass. Of course, final weight varies directly with initial weight when the total gain is constant and with total gain when initial weight does not vary. There is an interrelation of feed and these other factors which must be kept in mind to understand the result in any particular instance. When hogs are grown and finished on rations of normal hardening character, firmness varies directly with final weight or degree of finish. When distinctly softening rations are fed the greater the gain and final weight the softer the carcass. With intermediate rations final weight appears to be of less importance than initial weight and rate of gain, particularly the latter, provided the hogs reach at least a moderately high degree of finish.

At any given weight, small-type hogs normally show the highest degree of finish, medium-type hogs next, and large-type the lowest. On a common ration, such as corn with nonsoftening supplements, firmness varies with degree of finish. Thus there is a definite relation between type and firmness.

In view of the commercial importance of these results progressive producers should find it profitable to keep informed on further developments in this field of study.

O. G. Hankins,
Senior Animal Husbandman, Bureau of Animal Industry.

POTASH Development in United States Requires By-product Utilization The rapid progress now being made in the development of America's potash industry invites speculation as to the future of this industry, and particularly as to the maintenance of this present rate of growth.

American production of potash salts in 1928 amounted to 104,000 short tons, an increase of 36 per cent over that of 1927. This tonnage was the output of two principal producers, who manufactured, respectively, 90 per cent and 10 per cent of the total, utilizing as raw materials natural potash—borax brines and distillery waste, respectively. The increase noted was due to developments within the larger of these two plants.

From the foregoing it would appear that potash activities in their more aggressive and spectacular aspects are restricted to one enterprise; and on this basis the further statement may be justified that present progress is dependent on the exploitation of a single potash raw material.

Despite this progress, importations of potash salts from Germany and France in 1928 amounted to 976,000 tons, of a value of $22,520,000. This tonnage represents an increase of 34 per cent over importations in 1927. Here is represented the present American market for potash salts, a total of 1,080,000 tons, of which 20 per cent (in terms of actual potash content) is supplied by American industry. The question arises, with this market available, why is it not entirely supplied with potash from domestic sources instead of continuing to be dependent on foreign sources for this agricultural and industrial essential? Both

of the raw materials, the basis of the present American industry, are capable of much more extensive exploitation. Why is the industry not immediately expanded, therefore, to meet the demands of the American market?

Elaborate Processing Necessary

The answer is to be found in the fact that potash for liberal use in agriculture must be cheap, by which is meant its manufacturing and transportation costs must be low. Potash as it occurs in nature is always combined with other elements and compounds, constituting mixtures of which the potash is rarely over 10 per cent and generally much less. Before it can be transported economically it must be concentrated, for its price is based on its concentration, while its transportation cost is based on its total weight. In its raw state, therefore, it must be subjected to more or less elaborate chemical processing to convert it into a more concentrated form and in most instances to rid it of other ingredients and combinations, which detract from, if they do not completely nullify, its plant-food value. This processing represents costs which, if it is to be sold at a low price, the potash alone can not bear. Accordingly, other products must be produced concurrently to share the cost of manufacture, and it may easily happen that it is the limited market for these necessary side products that determines the extent to which a given potash raw material can be economically exploited.

FIGURE 141.—Crystallizing house in American potash plant

The solution of the American potash problem may, therefore, lie not in the further development of industries already established, but in the exploitation of raw materials not yet under commercial development.

From this viewpoint American potash reserves are enormous in extent and fortunately are widely distributed with respect to agricultural areas, so that the potash produced therefrom can be delivered to the farms in the contiguous territories at moderate costs as compared with the present costs of bringing potash from the German-French mines for distribution over the United States. This is a cost, now borne by the American farmer, which must be radically reduced.

Conspicuous among these reserves may be mentioned Searles Lake, Calif., now under successfiul exploitation, as mentioned above, containing 20,000,000 tons actual potash (K_2O); the greensand deposits of New Jersey, Delaware, and Maryland, containing in excess of 260,000,000 tons; the leucite deposits of Wyoming, containing 200,000,000 tons; the potash shales of Georgia and other States, enormous in extent, containing an amount of potash which has not been estimated; the potash brines of Nebraska, containing 250,000 tons; the alunite of Utah, containing 500,000 tons; the potash brines of Utah, whose occurrence is too widespread to admit of accurate estimation, and the extensive saline deposits underlying large areas in northwest Texas and eastern New Mexico, now under exploration by Governmental agencies.

Industrial Wastes That Carry Potash

In addition to these natural deposits there are certain industrial wastes carrying important percentages of potash, which are now being produced in quantities aggregately very large, but which for the most part are now being thrown away and irreparably lost. Conspicuous among these are cement dust, 85,000 tons (K_2O) a year; blast-furnace dust, 84,000 tons a year; beet-sugar (Steffins) waste, 16,000 tons a year; and distillery waste, 140,000 tons a year.

FIGURE 142.—Pump house and drill in potash plant

Since American consumption of potash at present is at the rate of 330,000 tons a year, it is apparent that these reserves are adequate for future demands of agriculture for a great many years to come and at a greatly increased rate of consumption. What the situation requires is the development of various chemical processes applicable to these various raw materials for the production of by-products and of sufficiently large markets for these to provide for increasing potash production. The foundation in chemical data is now being laid by chemical research.

J. W. TURRENTINE,
Senior Chemist, Bureau of Chemistry and Soils.

POTATO Yields Per Acre Can be Much Increased With Economic Efficiency The potato industry faced a most trying ordeal in 1928, and the growers in many commercial potato-production centers experienced serious financial losses as a result of overproduction, with consequent low prices. On this account it would seem especially appropriate to consider seriously the future outlook of this valuable industry. The question confronting the grower is that of deciding whether in the face of low prices it is possible to produce potatoes without incurring a

financial loss. In other words, can production costs be reduced to a point where it is possible to break even or to make a small profit at such low prices as those that prevailed throughout the crop-marketing season of 1928?

There is a growing realization on the part of progressive agriculturists that the business of farming must ultimately be conducted on the same basis as any other industry. The business principles considered necessary to the success of any manufacturing industry as far as possible must be adopted in crop production. What is needed in the potato industry is a considerably reduced acreage and a greatly increased production per acre. Instead of producing an average of about 116.6 bushels per acre during the years 1924 to 1928, the United States should be producing 200 or more bushels. To increase the average acreage production by more than 71 per cent may seem like an impossible undertaking and certainly not one to be accomplished overnight. However, when it is realized that certain growers in California and at least one in Colorado within the past three or four years have succeeded in producing yields of more than 1,000 bushels per acre, the task does not appear so difficult.

Influence of Potato Clubs

One of the most important recent influences bearing upon increased production per acre is that of the 300, 400, and 600 bushels per acre potato clubs that have come into existence in a number of States. The desire to become a member and to retain membership in these clubs has led to the adoption of up-to-date cultural practices, and, what is still more important, it has furnished abundant evidence of the possibility of producing potatoes at a greatly lessened cost per bushel. In other words, it has confirmed the statement that the problem of cutting the cost of producing a bushel or a hundredweight of potatoes resolves itself into increasing the yield per acre with a minimum expenditure of labor and capital consistent with good farm practice.

At present it probably costs the average potato grower approximately 75 cents to produce a bushel of potatoes. Compare this cost figure with that of 52 growers enrolled in the Ohio "400-bushel potato-club contest" in 1928.[12] The average yield per acre varied from 426 to 57 bushels, and the cost of growing a bushel of potatoes varied from 32 cents to $2.38. The low-cost producer was second highest in average yield per acre, whereas the high-cost man had the lowest acre yield. Further analysis of the data showed that growers producing 350 bushels per acre did so at an average cost of 34.9 cents per bushel. Those whose yields were between 300 and 350 bushels per acre had an average cost of 43.3 cents per bushel. Growers whose yields fell between 250 and 300 bushels had an average cost of 49.6 cents per bushel, whereas the cost to those producing between 200 and 250 bushels was 59.2 cents; the cost to those producing between 150 and 200 bushels was 75.1 cents, while the cost of producing from 150 to 200 bushels was 89.4 cents. The production cost of the four farmers whose yields were less than 100 bushels per acre (from a total of 37 acres) was $1.74 per bushel.

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12 MILLER, GUY. VARIATION IN COST OF GROWING OHIO POTATOES IN 1928. Proc. 14th Ann. Meeting Ohio Veg. Growers Assoc., 1929, p. 21-23.

Records of 43 Pennsylvania Farmers

The records kept by 43 Pennsylvania potato farmers in 1927, as published by the Pennsylvania State College and Agricultural Experiment Station, show that the cost per bushel varied from 29 cents to $1.57. The data further show that 32 per cent of the farmers produced potatoes for less than 50 cents per bushel, and 49 per cent of them for less than 60 cents.

It is apparent from the foregoing data that there is a wide variation in the cost of producing a bushel of potatoes, and it is equally clear that those who had the lowest cost are the ones who are the most likely to survive financially. It is not possible to enter into any general discussion of the reasons for the widespread variation in these cost figures, but it is quite obvious that economic efficiency must have played an important part in obtaining increased yields at a lower unit cost.

The experience of many growers and potato specialists has developed certain practices which if carefully followed will lower production costs and make profits from the crop more nearly certain. In presenting the following seven practices it is not assumed that they are the only ones, but rather that they are the more important factors in the production of a large yield. These are: (1) A suitable potato soil and crop rotation; (2) the proper plowing and fitting of the land; (3) an abundance of available plant food; (4) good seed of a suitable variety generously used; (5) good tillage of the crop; (6) proper protection of the plants from crop pests; and (7) careful harvesting and handling of the crop. Space does not permit of a discussion of their importance. It will suffice to consider the items of greater efficiency in the conduct of the various mechanical operations involved in the growing of the crop.

Mechanical Aids in Growing Potatoes

The old-time method of plowing the land with a pair of horses and a man-held 1-furrow walking plow is rapidly being supplanted by a tractor-drawn plow that turns two, three, or more 12, 14, or 16 inch furrows and that is provided with sufficient tractive power to plow the land to a depth of 12 or more inches if desired. Economic efficiency reduces the cost of plowing and also reduces the cost of preparing the seed bed, because the same power can be applied to a cutaway disk and harrow two or three times the width of the ordinary 2-horse implements. The tendency to speed up has resulted in the use of 2, 3, and 4 row tractor-drawn planters and cultivators, and these same practices are also being applied to the spraying of the crop. The same thing is true with respect to harvesting. The tractor is gradually replacing the horse in hauling the elevator digger, as shown by the use of 2 and 3 row diggers. The mechanization of farming operations has reached the point in some instances where the horse has been completely displaced by tractor-drawn or motorized farm implements. It is easily conceivable that where large-scale operations are possible, production costs, at least so far as man and horse labor are concerned, may be considerably reduced. The commercial potato grower of the future must therefore be ready to adapt himself to changing economic conditions. It will become increasingly more difficult for the inefficient grower to compete successfully with the efficient one. A low cost of production should be the goal of every commercial potato producer.

The San Luis Valley, Colo., potato grower who in 1928 produced 1,047 bushels of potatoes on a 5-year-old alfalfa sod which was plowed to a depth of 14 inches and which received only two cultivations after the plants emerged, has little to fear from a competitor growing only yields of 116.6 bushels per acre.

William Stuart,
Senior Horticulturist, Bureau of Plant Industry.

POULTRY Feeds Should Be Chosen for Protein Minerals and Vitamins

In formulating rations for farm animals, consideration for many years was given chiefly to the total digestible nutrients and total crude protein in the ration. As knowledge gained from experiments increased, it became apparent that the total of digestible nutrients was not so important as the total net energy, because all the digested material is not available for maintenance and growth, or for maintenance and production of fat, milk, or eggs. It was learned also that the quality, as well as the quantity, of the protein has to be considered.

Yet even when rations were prepared with due regard to the net energy and the quality and quantity of the protein, many cases were observed in which rations formulated along these lines were inadequate. Then came the discovery of the vitamins, quickly followed by an appreciation of the fact that the inorganic part of the diet likewise is highly important.

Along with this growth of knowledge regarding the facts and principles of animal nutrition there has grown, but perhaps more slowly, an appreciation of the need of keeping the animals in sanitary quarters. The value of sanitation has been repeatedly demonstrated, especially in the case of poultry. Good feed alone is not sufficient for the production of strong, healthy birds; it is necessary also to keep them reasonably free from all external and internal parasites, and from disease.

So long as it is a rather general practice to keep some feed before the growing chicks and the laying stock at all times, one need not be greatly concerned with the net energy content of rations; feeding is now not so much a question of enough energy as a question of enough well-balanced protein, an adequate supply of the necessary vitamins, and sufficient inorganic compounds.

Feed Requirements Change as Chick Develops

If rapid growth is desired, relatively large amounts of protein must be fed. A chick's maintenance requirement is very small in comparison with its growth requirement but increases with age. Hence it is clear that the feed consumed during the first few weeks must be rich in protein and that, as the chick approaches maturity, its feed should contain relatively more carbohydrates and fats. Rapid growth may be obtained on diets containing, for the first three or four weeks, from 20 to 25 per cent of protein of good quality, and for the next five or six weeks, 16 to 20 per cent. For egg production, such high levels are not necessary, but quality of protein is, perhaps, just as important here as it is for growth. Chickens bred for high egg production can get along very well on diets containing 16 to 18 per

cent protein, if it is of good quality. Diets of high-protein content apparently have a tendency to stimulate egg production, but protein is an expensive nutrient and, therefore, economical production of eggs is not always obtained by feeding diets of high protein content.

The proteins, alone, are unable to supply the nutritive needs of the growing chick or the egg-producing fowl; there still is need for the vitamins and the minerals, or inorganic portion of the diet. It is true that there may be other essentials, but in the usual diets these other essentials, if such there are, accompany the other ingredients of the diet.

Sources of Essential Vitamins

According to our present knowledge, vitamins A, B (the complex), and D are the only ones to which special attention must be given in the feeding of chickens. Vitamin C is generally supposed not to be required in avian nutrition. As for vitamin E, it is probably essential, but the usual diet is likely to contain a sufficient amount.

For supplying vitamin A in the feeding of poultry, yellow corn is especially valuable since it, at the same time, supplies an appreciable amount of vitamin B. Alfalfa is also considered as an excellent source of vitamin A; in fact most legumes are fairly good sources of this factor. Although in poultry feeding cod-liver oil is usually used as a source of vitamin D, it may have also, depending upon its source, a rather large amount of vitamin A.

Good sources of vitamin B (the complex) are wheat and most wheat products, corn, oats, and barley. Most of the root crops are also fair sources of this vitamin. One of the very best sources is yeast.

At present, the best source of vitamin D for poultry feeding is cod-liver oil. Sunlight supplies this factor indirectly, and where the birds receive an abundance of direct sunshine, no other source of vitamin D should be necessary. Various forms of ultra-violet ray apparatus may be used for supplying this factor.

Vitamin E is widely distributed in foods and feeding stuffs and, therefore, it is not likely that the average diet will be deficient in this factor. Very excellent sources of this vitamin are wheat germs and the oil obtained from wheat germs.

Products That Supply Mineral Requirements

A large number of inorganic materials are needed for growth and egg production. Those required in largest amounts are calcium and phosphorus, and to a somewhat lesser extent, sodium, chlorine, and potassium. Sulphur, iodine, iron, copper, fluorine, silicon, and magnesium are required in small amounts, and possibly manganese and zinc also. Bone and bone ash in their various forms are both excellent sources of calcium and phosphorus, especially of the latter. Oyster shells and limestone of high lime content are among the best sources of calcium. Sodium and chlorine are easily supplied as ordinary salt. The other necessary elements are generally present in adequate amounts in the feed, although at times it may be necessary to feed additional iodine and sulphur. The former is best supplied as "iodized" salt and the latter as flowers of sulphur, sodium sulphate, and calcium sulphate. Until more definite information is available, it

would not be wise to have more than 0.5 per cent of iodized salt, sodium sulphate, or calcium sulphate in the diet.

Thus, at the present state of knowledge, profitable poultry feeding is largely a matter of proteins, minerals, and vitamins. It necessitates a knowledge of the feed requirements of chickens for growth and for egg production, an intimate acquaintance with the composition and special properties of feeding stuffs, and an appreciation of the need of sanitary quarters.

HARRY W. TITUS,
Associate Biological Chemist, Bureau of Animal Industry.

POULTRY Inbreeding, if Practiced too Closely, is Found to be Harmful A great deal of inbreeding work has been conducted with the larger animals, and the general impression prevails that a certain amount of inbreeding is necessary to fix desirable characters. Comparatively little inbreeding work has been carried on with poultry, and but few results have been obtained to show the effects of inbreeding on various factors. Of these factors, one of the first to be affected by inbreeding in poultry is hatchability. Experiments have been conducted, therefore, to determine what effect close inbreeding may have on the hatchability of eggs as well as on other characters.

This study is important for several reasons. One is the possibility of improving hatching quality and conditions of incubation. Another is the possibility that factors affecting hatchability may also affect other problems of economic importance. For instance, nutritional factors affecting hatchability may also affect egg production, or a diseased ovary may affect both hatchability and egg production. Nutritional factors affecting either egg production or the character of the egg may also affect hatchability, as in the case of a disturbed calcium-phosphorus balance or feeding hens to produce light-colored yolks.

Previous Experimental Work

Moreover, factors affecting hatchability may be definitely correlated with factors affecting constitutional vigor and longevity in the breeding stock, or vice versa. All of the factors mentioned may be affected by inbreeding, and certainly those that affect hatchability have a far greater significance than is indicated by the meager literature dealing with the problem.

The effects on hatchability of inbreeding and outbreeding have been determined by only a few workers, but so far as the writer is aware no attempts, other than those described here, have been made to compare hatchability results from full-brother-and-sister with those from half-brother-and-sister matings.

Cole and Halpin, at the Wisconsin experiment station, inbred Rhode Island Red brothers and sisters for four years and observed a marked decline in vigor to such an extent that in the fourth year hatchability was so low that the experiment had to be discontinued. The basis of selecting the full sisters and brothers each year was on the color of the plumage of the back, other characters, such as constitu-

tional vigor and egg production, not being considered. Another inbreeding experiment was begun with Rhode Island Reds, in which full brothers and sisters were selected each year on the basis of the hatchability of the eggs and the livability of the chicks, these two characters having been assumed to be a measure of constitutional vigor of the parent stock. It is stated that the general vitality of the stock was raised but egg production decreased, which may have been due to the fact that egg production was not taken into consideration in selecting the breeders each year.

Results From Inbreeding Leghorns

Dunn, at the Rhode Island experiment station, reports the results secured in inbreeding six lines of White Leghorns, in which case the basis of selection each year was the number of full sisters available for mating on February 1 of the pullet year. At that time the group was chosen which had the largest number of full sisters and at least two full brothers, one for mating and one for reserve. The results obtained by Dunn show that hatchability decreased materially from the first to the second year in the inbred lines, and that thereafter there was a decrease each year.

Pearl and Surface, of the Maine experiment station, crossed Barred Plymouth Rocks with Cornish and observed an increase in hatchability over that of each breed. Warren at the Kansas experiment station crossed White Leghorns with Jersey Black Giants and also observed an increase in hatchability over that of either parental breed.

In order to study the matter further, work was undertaken at the United States Animal Husbandry Experiment Farm, Beltsville, Md., to determine the effects of such close inbreeding as full-brother-and-sister mating and half-brother-and-sister mating on hatchability. For each of the years the hatching period extended from March 17 to the last week in April; the eggs were incubated under as uniform conditions as possible throughout each hatching season and from year to year. The data analyzed involved hatching results from 515 individual matings, each of which produced 10 or more fertile eggs.

Inbreeding Increases Embryo Mortality

The general conclusions indicate that full-brother-and-sister matings and half-brother-and-sister matings tend to decrease hatchability by increasing the percentage of embryos dying during incubation.

Such close inbreeding affects embryo mortality from the eighteenth to the twenty-first days of incubation to a greater extent than embryo mortality from the first to the seventeenth days of incubation.

Hatchability results are affected to a greater extent in the first year of inbreeding than in successive years, though there is a general decline in hatching results each year that such close inbreeding is continued.

There is no appreciable difference in the hatchability resulting from the two kinds of mating, although the adverse affect of inbreeding was slightly greater in the full-brother-and-sister matings.

MORLEY A. JULL,
Senior Poultry Husbandmen, Bureau of Animal Industry.

POULTRY Production Is Increased Materially by Battery Brooding Commercial poultry farming has developed tremendously since 1885, when artificial brooders were first used in the United States. Various types of brooding systems have been used, all of which tended to increase the production of poultry. These types include the hot-water-pipe brooders in long brooder houses, used extensively for the raising of ducks, and also for winter-broiler raising, and the colony stove brooders used generally for reproducing the commercial flocks and many of the farm flocks of the country. The battery system of brooding has more recently been taken up and its use has grown rapidly in the last two years.

Battery brooders were first developed as a result of the rapid growth of the baby-chick industry and were merely wire-bottom shipping boxes used for holding surplus baby chicks until these were sold. Chicks lived so well in these simple boxes that brooding equipment arranged in a battery form was developed for raising chicks. Meanwhile feeding experiments had shown that chicks could be raised successfully indoors for weeks, provided certain vitamins were fed in their rations. Chicks fed for rapid growth were raised successfully to broiler size in these coops, arranged in from four to six tiers and kept at a suitable temperature. Somewhat similar batteries with wire floors have been used for many years in commercial fattening stations for fattening chickens which are well beyond the brooding stage. The Department of Agriculture is using the principles involved in battery brooding as well as some of the small individual brooder units in nutritional and parasitic studies at the United States Animal Husbandry Experiment Farm, Beltsville, Md.

FIGURE 143.—One type of individual battery brooder

Numerous types of batteries have been manufactured for the battery brooding of chickens. Both individual (fig. 143) and long tiers of batteries are used. Some are arranged with individual heating devices while others, without individual heat, are kept in a heated room. Various kinds of heat are used in these batteries, electricity and hot water being most common. From 60 to 100 baby chicks are put into each compartment, and from one-fourth to one-third of this number can be raised to broiler age there; the remainder need to be transferred to other batteries or put on range as the chicks grow and require more room. Some poultry raisers are using very extensive equipment of this type, brooding several thousand broilers in one room at one time.

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These battery brooders are usually of metal, with floors of ½-inch-mesh hardware cloth or wire which permits the droppings to go through to the pan placed under each unit. Feeding and watering troughs are attached to the front of each coop. The wires or openings in the front of each compartment are arranged so that the chickens can get at the feed and water freely, and removable fronts adapted to the size of the chickens are usually provided. Commercial batteries are generally used for this purpose, although some poultry farms are equipped with homemade batteries.

Advantages Claimed for the System

The advantages claimed for the use of battery brooders are less disease in the rearing of the chicks, saving of brooder space, reduced labor costs, and operation independent of the season of the year and weather conditions. There is also a material saving in fuel. Remarkable results have been achieved in the use of battery brooders in overcoming common losses from certain diseases and parasites. Since the chickens can not pick at their droppings in these batteries, diseases which have been spread through the droppings and on the ground are much more easily controlled. Such diseases, especially coccidiosis, have been the cause of tremendous losses in young chicks brooded on solid floors with outside yards.

The saving of space is apparent, as a large number of batteries may be kept in one room. Even temperatures are easily maintained, and outside weather conditions become of relatively less importance where the chickens are brooded indoors. Chicks may be brooded at any season of the year, and the cost of the chicks and the market for the broilers are the factors which influence the time of operation more than the weather conditions. Battery brooders are planned for the convenience of the operator, and large numbers of chicks can be cared for in a short space of time in these coops. The chicks are in small groups so that any sick or dead chickens are readily seen, and there is ittle chance for the crowding, which is often a serious problem in larger broods of chicks.

Ration Must Include Cod-Liver Oil

Feeding becomes an extremely important factor in battery brooding, since the chicks get only the feed which is supplied and have no chance to balance their ration with green feed, minerals, and insects usually picked up on range. The chicks are fed all-mash rations which must include minerals, milk, and some substitute for green feed, such as alfalfa meal. Cod-liver oil must be included in this ration, and 1 per cent of oil in the mash is recommended. The use of the oil prevents the leg weakness caused by lack of vitamin D and sunlight. The department has secured excellent growth with chicks confined in brooder houses on the following all-mash ration:

	Per cent
Yellow corn meal	40
Ground wheat	22
Corn gluten meal	10
Dried buttermilk	10
Meat scrap	10
Bone meal	3
Alfalfa-leaf meal	2. 5
Yeast	2
Salt	0. 5

From 1 to 2 per cent of cod-liver oil is added to this feed, and mixed fresh in the ration every 10 days.

Batteries do not eliminate all of the difficulties encountered in the winter brooding of chicks, and success can be achieved only by careful attention to all details. Difficulty is frequently encountered with the chicks' picking one another, and a form of leg deformity not prevented by the feeding of cod-liver oil may be the cause of much depreciation in the value of the chicks. One group of chicks may pick one another while similar groups on the same feed will not do this. The exact reason for this cannibalism is not known, and its cure is debatable. The use of milk and green feed in the ration, the tipping of the upper beak, and the use of metal blinds on the sides and fronts of the batteries are some methods used in overcoming this vice. Recent experiments indicate that there may be a vitamin deficiency which causes the leg deformity. This vitamin seems to be contained in green feed and in sour milk.

Mash is kept before the chicks all the time, but it is not advisable to feed over 14 hours a day, as the chicks may eat too much and grow too rapidly. Some poultrymen have tried keeping the room lighted all night with feed before the chicks, but this method is not advised. Chicks for broilers may be raised to market age on this one feed, except that it is advisable to omit the cod-liver oil a week or 10 days before marketing.

Temperatures Commonly Used

The temperature to use depends on the kind of batteries and the method of heating. The chicks need a temperature of about 90° to 95° F. the first week, and of about 90° the second week. It is lowered to about 85° the third week and 80° the fourth week. A temperature of about 80° should be maintained until the chickens are well feathered. Where the batteries are in a heated room and chicks are of different ages the stock may be moved down in the lower tiers as they get older, the upper tiers being kept at from 85° to 90° and the lower tiers at 80° to 85°. If the pullets are to be raised they are removed from the batteries when about 8 weeks old and put on range or raised on floors indoors. Broilers may be kept in the batteries until marketed, the number in each compartment being reduced according to the size of the chicks. Broilers raised in this manner are more tender and have softer flesh than chickens raised on range.

A high degree of sanitation is essential in this method of raising chicks. The dropping pans should be cleaned daily and the batteries kept disinfected. The feed and water troughs must be kept clean. The wire floors in each compartment aid greatly in providing sanitary quarters for the chickens. Good ventilation without drafts must be provided. The humidity in the room should be kept at from 50° to 60° F., if possible.

The best time and age to market broilers depends on the breed kept and on the market conditions. Leghorn cockerels will weigh from 1½ to 1¾ pounds at about 10 weeks; the heavier breeds are usually marketed when they weigh from 2 to 2½ pounds, which will be at from 10 to 12 weeks of age. These methods of raising chickens are adapted primarily for producing broilers when they do not compete with the regular spring crop of chickens. Highest broiler prices are usually obtained in February, March, and April; and the lowest prices

in September, October, and November. The higher prices of early spring gradually taper off but usually remain fairly good through June and into July. Prices of these broilers, fresh-killed, fluctuate more or less from year to year, and the poultryman in raising broilers has to take a chance as to what the price will be when the chickens are ready for market.

Battery brooding is also being used to some extent for raising pullets, especially on poultry farms where heavy losses have occurred in yards contaminated with disease and parasites. Batteries have been very helpful in raising pullets free from worms where the yards around the brooder houses have been infected with parasites. The pullets are usually removed from the batteries after they are well feathered and no longer need heat. They are then put on a good range, which is free from disease and parasites. A few poultrymen are raising pullets to maturity in these batteries. There is also a growing market for chickens which are old enough so that they no longer need artificial heat, and batteries may be used to supply this demand. The pullets can be sold at 8 weeks of age, after the danger period is over and put on range, while the cockerels are kept and fattened for market.

A. R. Lee,
Poultry Husbandman, Bureau of Animal Industry.

PRECOOLING Apparatus Devised for Handling Carloads of Perishables

Since the first demonstration of a portable precooling plant by the United States Department of Agriculture about 20 years ago, numerous attempts have been made to develop apparatus capable of precooling loaded refrigerator cars without involving the use of a large amount of equipment. The greatest objection to the use of most of these small portable plants has been that they were inefficient or that they had to be applied to the car to be cooled in such a way that complete car loading could not be accomplished until the apparatus was removed. This, of course, prohibited the entire load from being conditioned. To overcome these objections and at the same time by means of low initial cost put precooling within the financial reach of shippers and packers at small loading points where precooling facilities are lacking, a simple and inexpensive apparatus and a method for precooling car lots of perishables have been developed recently by the Bureau of Plant Industry.

The method consists in reversing the natural air circulation within a loaded refrigerator car so that the top layers of the lading are chilled even more rapidly than the bottom layers. The apparatus necessary to accomplish this air reversal comprises two small motor-driven blowers, each capable of moving more than 1,000 cubic feet of air per minute, placed one in each ice bunker directly under the bunker hatches, with the blower discharges directed through the top bunker opening into the body of the car. By closing the top bunker openings by means of paper except immediately in front of the discharges, a reversal of air circulation within the car is obtained, so that the movement is upward through the ice, out over the top, and down through the load, thence back under the false flooring into the bottom bunker opening.

Importance of Salt Proportion

The rate of cooling of the load is dependent somewhat upon the nature and initial temperature of the lading, but mainly upon the quantity of salt mixed with the bunker ice for the purpose of accelerating the cooling. By correctly proportioning the salt, operation of the blowers for a 5 or 6 hour period will generally lower the temperature of the load to a safe carrying temperature, regardless of the initial temperature of the lading, the top layers being chilled the most rapidly. Upon removal of blowers and paper, air circulation within the car assumes its natural direction down through the ice, out through the bottom bunker openings, up through the load, and back into the top bunker opening. The bottom layers of the lading are further cooled during this process.

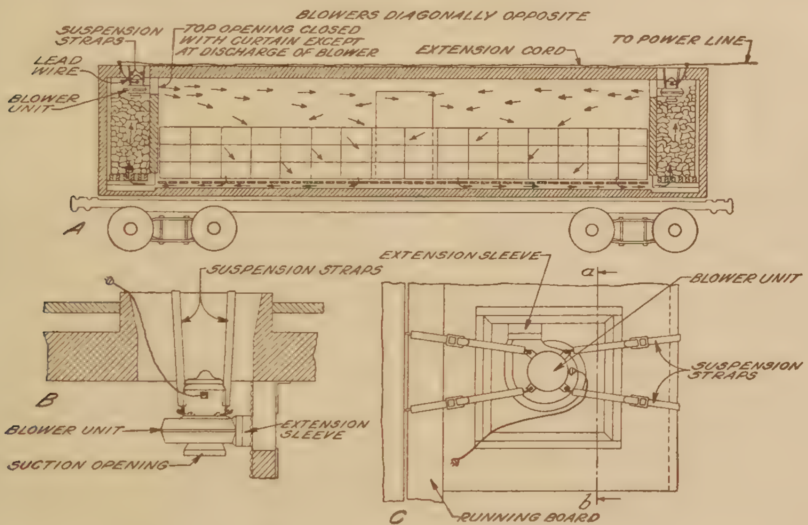

FIGURE 144.—A, Longitudinal section of a refrigerator car; B, section showing the blower in position in top of bunker and supported by the suspension straps; C, top view of hatch showing the position of the suspension straps and the blower

The equipment is small and easily handled. Each blower unit, consisting of the motor and blower, has a weight of only 85 pounds, which enables one man to move it without trouble. The ½-horsepower motors are of the single-phase repulsion-induction type, wound for 110 or 220 volt 60-cycle current. With this double voltage winding, power conditions in most parts of the country can be met. Each assembly is suspended under the hatch opening by means of flat, adjustable web straps which are fastened by hooks at the upper ends to the running board on top of the car on one side and under the eaves on the other side. (Fig. 144.) This method of suspension allows the hatch plugs to be replaced tightly during blower operation, thus eliminating air leaks. The strap-length adjustments allow for variations on different types of cars.

Adjustable Extensive Sleeves Used

In order to compensate for the difference in bunker widths, adjustable extension sleeves are used between the blower discharge openings

and the bunker screens. Leads from the motors are brought up beside the cushion edges of the hatch plugs and attached to an extension cord of suitable size. The end of this cord is plugged into a convenient socket or receptacle with the correct voltage.

Numerous tests have proved the process and apparatus to be capable of precooling car lots of highly perishable commodities, such as strawberries and peaches. When fruits larger or harder to cool than these are to be conditioned, there is no doubt that the removal of a greater amount of heat can be accomplished by a longer period of operation of the blowers or by the use of larger quantities of salt.

Considering that the precooler is not limited in use to efficiently conditioning a certain few commodities, and that objectionable features, such as high cost, bulky equipment, and incomplete cooling of loads have been overcome by the design and method of operation, it is believed that the apparatus herein described will supply the demand for a simple and economical precooling plant.

A. G. Galloway,
Principal Scientific Aid, Bureau of Plant Industry.

PRINTED Word Most Effective Extension Method, Survey Shows Educational agencies in agriculture have been augmented in recent years in keeping with the increased public attention that has been focused upon agriculture and with the emphasis now placed upon the economic phases of the industry. The enlarged activities are manifest in colleges and vocational schools, extension forces, and exhibit, publication, press, and radio personnel. The several teaching methods are firmly established in the general program of promoting the welfare of agriculture and rural life.

Much has been written about the relative effectiveness of these methods. During 1929 there were completed several surveys which definitely indicate the effectiveness of the printed word as a means of furthering agricultural education.

Farmers read and apply the information which they secure from their reading. Surveys show that the printed word is one of the most effective, cheapest, and least time-consuming extension methods. This fact more than justifies the publication and press programs of agricultural institutions.

Approximately 90 per cent of the farmers of the United States take one or more farm journals, about 70 per cent take a daily newspaper, about 55 per cent take a country newspaper, and over 20 per cent have radio sets. Farmers receive from the Federal Government and from State agencies approximately 30,000,000 bulletins annually. The farm journals, long recognized as leaders in the development of agricultural life, are doing increasingly effective work. Daily newspapers devote approximately twice as much space to agriculture as they did 10 years ago. In all the States many weekly publications devote special departments or pages to agriculture. Popularized contributions by scientists have increased materially. County agents and others are encouraged to place interpretative material in the newspapers. In all, about 3,500 Federal and State employees contribute articles on agriculture

regularly to the press. To supplement the printed word, the Department of Agriculture utilizes nearly 50 per cent of all the radio stations in the United States, and many agricultural colleges broadcast regularly.

Valuable Data Not Yet Published

By no means, however, should it be felt that our educational program, in all its phases and with all its methods, has approached the ideal. There are valuable data in the colleges, experiment stations, and the United States Department of Agriculture that have not been published. Serious arrears exist in many phases of the publishing program. On large farming areas out-of-date methods of production are used. Educational work in agricultural economics by means of the printed word will obviously demand greater effort. Many farmers are not as yet reached by facts produced for the benefit of all.

No single method of carrying information to the public can supplant the other methods. Rather, each must supplement the others. Extension work supplements the college; radio supplements the press and bulletins; exhibits and motion pictures aid the program in all its phases. The purpose of all research in agriculture is to increase the knowledge of those who produce, market, grant credit, or in any other way take part in the agricultural industry. Research does not achieve results merely for classification.

The results of research to-day are greater and more accurate than formerly, and means of distributing these results are more efficient. But there is need for an increased number of competent interpreters, and coordinators, so to speak, of the data thus accumulated. Every one is thinking about agriculture now, but most people perforce do their thinking without adequate basic information. Here is an opportunity for constructive educational work. Agriculture's educational institutions might very usefully devote more time to synthesizing and popularizing their material. Interpreted data in printed form are permanent. It is not unlikely that in time every American farmer will possess bound copies of Federal and State bulletins covering his problems adequately. These will be supplemented by the more ephemeral news and interpretations carried by farm journals, newspapers, and general magazines, and by radio.

MILTON S. EISENHOWER,
Director of Information.

PRODUCE Agency Act Enforcement Reveals Improper Practices The produce agency act has been in force three years, and the officials of the Department of Agriculture who investigate complaints under the act have learned of many practices in the produce trade that are not conducive to fair dealing with the shipper or to the establishment of satisfactory trade relations. The number of complaints filed increases steadily. The increased use of this law is evidently due to cumulative publicity and satisfactory results to shippers, through the incidental recovery of additional payments on consignments. Table 17 indicates the nature and growth of the work.

TABLE 17.—*Complaints filed under the Produce Agency Act, July 1, 1927–June 30, 1929*

Nature of complaint	July 1, 1927 to June 30, 1928	July 1, 1928 to June 30, 1929	Total
No returns received by shipper	19	93	112
Correctness of returns questioned	66	124	190
False statements alleged	4	11	15
Unjustifiable dumping alleged	3	1	4
Total	92	229	321

The purpose of the produce agency act is to prevent dealers who receive perishable farm products in interstate commerce, on behalf of others, from making false returns or false statements to the shippers with intent to defraud, and to prevent the dumping of produce without good and sufficient cause. Violation of the act is a misdemeanor punishable by fine or imprisonment.

Most Dealers Cooperate

Most dealers give full cooperation to the Federal investigator, but sometimes cooperation is given reluctantly, as might be expected when the accounting is not likely to correspond with actual facts. Usually when discrepancies have been found, dealers have been anxious to make settlement with the consignor. Guilt is usually not difficult to detect. Few persons are able to cover all the traces of a fraudulent practice.

One dealer made a practice of soliciting consignments and reporting sales, whereas, in fact, he bought the shipment upon arrival at his own price, retained the profit of the sale, and collected a commission from the shipper. This practice is grossly unfair to the shipper. Another dealer included the standard refrigeration charge in the item of freight charges when, in fact, he shipped the produce under initial icing, thereby retaining the difference in refrigeration cost for his own use without the knowledge of the grower.

Another dealer made a practice of reconsigning shipments to other markets but made returns as if the produce had been sold in his own market. He did this by reducing the amount of gross sales to offset the additional cost for freight to the second market, and the additional commission. The shipper did not realize that he was paying an additional freight charge and two commissions and that this was the reason for his small net proceeds. Dealers have been found to cover up a brokerage or second commission by reducing the amount of the gross sales in their own market. The shipper is defrauded accordingly.

Delay in Making Remittances

Some dealers who receive many express shipments apparently do not make remittances until after frequent appeals from the shipper and in some instances not even then. In a case investigated the accounting rendered was greatly below the actual sale prices. On the other hand, some shippers consign produce unsolicited, fail to show their names and addresses on express shipments, and send no notice of shipment.

A dealer overstated the freight charges and understated the gross receipts, thereby making a decided additional profit; another collected

loss and damage claims of substantial amounts from the railroad but retained them instead of forwarding them to the consignors.

The department investigators learn of many other subterfuges of unscrupulous dealers, such as substituting frozen or decayed produce for good produce at the car door before calling for an inspection, and rejecting a purchased car of produce on a declining market with a false statement as to its condition, and then either getting an allowance or withholding part of the proceeds in accounting for the consignment.

The shipper suffers from these dishonest practices and is not in a position to protect himself except as he may call upon the department to investigate the transaction when the produce has been handled as a consignment. He should exercise great care in selecting the person or firm to which he consigns his produce.

Wrong Practices By Shippers

Fraudulent practices are not confined to dealers in terminal markets. All shippers are not careful to grade the produce strictly; many are inclined to pack as near as possible to the minimum of the specifications. Best packages are placed nearest to the car door or the finest fruit is at the top of the barrel or box.

Reports of inspection of the shipment upon arrival furnish evidence of the condition of the produce. These reports are frequently lacking when they would be helpful in settling disputes.

The produce agency act makes no requirement as to the kind of accounts which dealers must keep. Investigators have been impressed with the variety of systems of records and with the lack of records. Some dealers have scarcely sufficient records to indicate whether they have settled for all consignments. Frequently no lot number is shown on the sales slips to identify the sale with the particular shipment and sales slips are not numbered serially. This constitutes insufficient accounting. The commission merchant is the agent of the shipper and is expected to keep such records as will show all sales from the consignment. The shipper is entitled to these details from his agent, the commission merchant, if he requests them. Sales slips and all correspondence and other papers relating to a shipment should be retained at least six months after remittance is made to the shipper.

A development of more honest practices on the part of both the shipper and the receiving dealer would improve the confidence of one in the other, remove some of the speculation in the produce trade, and give the producer a larger share in the returns from his crops.

W. L. Evans,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

PRUNE Production Falling in Europe; Rising in the U. S. International trade in dried fruits, in recent years, has been marked by large and increasing production in the United States, with Europe as the largest factor in the purchase and consumption of supplies. The average total world production of dried prunes in recent years has been about 470,000,000 pounds. The United States supplied 75 per cent of this production. Of this total, about 50 per cent was exported to Europe. Average total world

FIGURE 145.—The Yugoslavian peasant delivering prunes to the packing plant. Horses are common in Bosnia, but ox teams are used almost exclusively in Serbia. The typical peasant garb is shown in the extreme right

production of raisins, not including currants, in recent years was some 800,000,000 pounds, of which the United States supplied about 600,000,000 pounds, or approximately 75 per cent. The countries of western Europe are the greatest consumers of dried fruits.

Important factors influencing the demand for American dried fruits in principal European consuming districts are: Direct competition

FIGURE 146.—View of one of the more modern type prune-processing plants in Bosnia. These plants are usually owned and operated by corporations, the stock in which is held by large financial institutions

with dried fruits from other exporting countries and indirect competition with fresh fruits, either imported or locally grown.

Countries competing directly with the United States in prunes are France and Yugoslavia. Prune production in France has been steadily declining, with every indication that this will continue. The generally low price of prunes in postwar years has caused peasants to turn to crops that promise quicker financial returns. Yugoslavia has shown a decline since 1927 in both production and number of trees. Low prices have had a tendency to reduce the total quantities of dried prunes for export, and larger quantities are used for brandy and jam. Improved railway transportation has facilitated the shipment of fresh prunes. A heavy toll of bearing prune trees has been taken by the Schildlaus (*Lecanium corni*). Through liberal financial assistance, the Yugoslavian Government is attempting to prevent further spread of this pest. The industry is elastic in that the seedling young tree comes into production quickly and new orchards are planted at little cost.

Consumption of fruits in Europe, especially fresh fruits, has generally been on the increase, partly as a result of extensive advertising campaigns. The United States is not keeping pace in advertising.

In uniform quality and neatness of pack, products from the United States stand far above others; but, in maintenance of personal contact with the trade, this country is behind. Large consumer organizations and the chain-store movement are increasing group buying. Competing dried-fruit exporting nations are centralizing within the industry such activities as improvement of quality, advertising, and marketing. So far, little has been done by dried-fruit growers in the United States to meet this growing tendency in Europe by centralized selling.

M. J. Newhouse,
Consulting Specialist, Bureau of Agricultural Economics.

PUBLICATIONS of the Department Grouped According to Purpose Those receiving the publications of the United States Department of Agriculture may wonder why they are grouped into classes or series, and what determines how they are named. What type of bulletin is published in each series, and what are the differences? In order to get and to use to the best advantage the agricultural information published by the department, and to avoid ordering bulletins they do not want, readers should have clearly in mind the characteristics of each series. In announcements or lists of department publications they see leaflets, farmers' bulletins, technical bulletins, department bulletins, circulars, miscellaneous publications, miscellaneous circulars, and statistical bulletins, as well as others of more special nature, and may be confused because of the large number of series or classes.

In general, agricultural publications may be divided into two groups: (1) More or less technical publications, presenting the results of research for those who, by training, education, occupation, or specialty, are able to make use of such information; and (2) popular publications, giving practical information in simple terms, so that it may be readily applied. Some publications are difficult to classify for they seem to belong to neither group.

Because of the variety and range of material published by the department, and the diversity of interests among readers, the department has arranged its publications in several series.

The leaflet series, started in 1927, is the newest. Leaflets are intended to be attractive in appearance and to present material clearly and in an easily understandable form for readers who wish specific directions or concise information. The leaflets are limited to eight pages. This series is very popular.

Aside from the annual reports, farmers' bulletins constitute the oldest continuous series now published by the department. The first one was printed in 1889. This series contains popularly written material on an exceedingly wide range of subjects pertaining not only to the farm, the farm home, and rural life, but also to some problems and conditions of interest to city people. The farmers' bulletin series is undoubtedly the best known of the department's series of publications.

For many years the department published the results of its research work in a technical series called department bulletins. This name was not distinctive, and did not indicate the character of the material. Hence it was stopped at Department Bulletin 1500, and the technical bulletin series was started. As the name implies, this series carries technical material resulting from research work conducted by the department.

Material of Indeterminate Character

As previously indicated, some material is not altogether technical or popular and does not seem to belong in the leaflet, the farmers' bulletin, or the technical bulletin series. It may not present the direct results of research, or if it does, the results may be of only limited application or interest. The material may be of a special character, as a compilation of data or information gathered from many sources, published or otherwise. For this general type of material, the circular, seems well suited. In some cases a circular contains material in the nature of a preliminary report of an investigation, the later completed work being published in a technical bulletin. In other cases the material is more conclusive.

Some matter to be printed may necessitate a publication of different character from those in any of the above-mentioned series. The material may be simple or very technical, brief or extensive, much illustrated or without illustrations. It may be merely a list of employees in a bureau or in the department, or in the agricultural colleges and experiment stations. In harmony with the varied nature of such material, it has been grouped in the series called miscellaneous publications. That name describes it fairly well. Formerly this series was designated miscellaneous circulars. The change was made because the name "circular" was not sufficiently broad to include all the types of publications printed in the series.

About 30 statistical bulletins have been published. As the name implies, these bulletins contain statistics on crops, livestock, and agricultural products (cold-storage holdings, shipments, prices). Each bulletin deals with only one general subject.

In addition to these series, each of which contains publications covering a wide range of subjects, the department issues other series containing matter more restricted or special in nature. Under this class are listed the annual reports of bureau chiefs and of the Secre-

tary, inventories of seeds and plants imported, North American fauna, service and regulatory announcements, soil surveys, yearbooks, miscellaneous folders, unnumbered publications, and posters.

The Department's Periodicals

Finally there are the periodicals, each issued at regular intervals throughout the year. They cover special fields and are designed primarily to aid those engaged in certain lines of work and others who require the information. The department periodicals published this year are: Agricultural Situation, Climatological Data, Clip Sheet, Crops and Markets, Experiment Station Record, Forest Worker, Journal of Agricultural Research, Monthly Weather Review, Official Record, Public Roads, Snow and Ice Bulletin, and Weekly Weather and Crop Bulletin.

The question whether the present grouping or arrangement of department publications is the best that is possible was studied during the year. Are there too many series? Would it be better to combine some of them? Or, in view of the diversified nature of the department's work and the variety of subjects covered in its printed matter, is it desirable to have as many series as at present? This problem is still under consideration.

M. C. Merrill,
Chief of Publications, Office of Information.

RABBIT Raising for Food and Fur Studied at Experiment Station The methods of production of domestic rabbits for food and fur now being developed at the United States Rabbit Experiment Station at Fontana, Calif., can be followed with profit by rabbit producers generally throughout the country. This experiment station was established in 1927 by the United States Department of Agriculture through the cooperation of local rabbit breeders in California and the National Rabbit Federation, and is operated by the Bureau of Biological Survey. Its primary object is to provide reliable information based upon experimentation for the benefit of all who are engaged in the rapidly growing rabbit industry. The establishment of the station fills a recognized need of breeders who are engaging in the business on an extensive scale and of farmers and others who are raising only a few animals as a side line to regular farming operations. The accomplishments at the station for the rabbit industry generally will be of help also to those who contemplate engaging in the business as well as to the younger members of farm and other families who are raising rabbits merely as a pin-money venture.

The rabbit industry has advanced, however, beyond the stage of a pet-stock business and is now an agricultural enterprise of considerable proportions throughout the country, particularly in the Pacific Coast States. In many rural sections rabbits are being produced in great numbers. In California great numbers of farmers keep a few pairs, and some raise 1,000 to 5,000 or more. To care for the products of these rabbitries large slaughterhouses are operated, equipped in some instances to handle 25,000 to 50,000 rabbits a month, particularly in the Los Angeles district. The food value of the rabbits served in the hotels and on the home tables of that city alone is estimated to be greatly in excess of $1,000,000 annually.

Research Needed for the Industry

An industry of such proportions, to be permanent and stable, must be based on scientific research. The cost of research is good insurance on both large and small investments in rabbitries. Problems confront all rabbit raisers regarding feeding, breeding, and housing conditions, and preventing the ravages of diseases and parasites among their stock. To provide a means of solving such problems and of developing economical and efficient methods of production was the aim of the organizations and individuals who tendered their cooperation to the department in the establishment of the Rabbit Experiment Station at Fontana.

The station is on the site of a 5-acre orange grove. The equipment furnished by the cooperators includes this tract, an administration building (fig. 147) containing laboratories, offices, and assembly hall, various open and closed types of shelters for hundreds of hutches (fig. 148), which are kept cool on hot days by a sprinkler system; a large feed-storage house for hay and grain; and an attractive residence for the director and his family. The director of the station is employed by the Bureau of Biological Survey, and reports to that bureau through its division of fur resources.

FIGURE 147.—Administration building of the United States Rabbit Experiment Station operated by the Bureau of Biological Survey at Fontana, Calif., to determine the best methods of producing rabbits for food and fur. The structure is of white stucco with a red tile roof

When the station was formally opened in March, 1928, there had been donated by the cooperators and others interested approximately 50 rabbits of different breeds and of various ages for use in the experiments. It was first necessary, therefore, to determine the ability of the stock at hand to produce uniform young before a suitable number of rabbits could be obtained for further studies. In August, 1928, with 125 rabbits available, five major experiments in feeding for production and maintenance were inaugurated. Thirty-six rabbits were obtained to replace poor producers and thereby maintain uniformity among the various groups. In the summer of 1929 there were available for the experiments 191 mature rabbits, 113 young, and 26 rabbits of fancy breeds. From 88 breeding does on two experiments, 1,182 young had been produced, of which 762 were carried through the weaning period.

Study of Rabbit Maladies Projected

The means by which rabbits can be raised to a marketable age at minimum expense, keeping in mind the opportunities for maximum profits from both meat and fur, are subjects of special attention at the station. These ends are being attained partly through a study of the factors that reduce losses among young rabbits and increase the prolificacy of the adults. The station was enabled to render excep-

tionally valuable service to the rabbit industry in the present year, through cooperation with the Universities of Minnesota and Southern California, in studying and controlling a malady that had attained epizootic proportions among domestic rabbits. The laboratory facilities at the station were not adequate at the time to cope with the situation without the aid of research workers in other institutions. Until authentic and adequate information can be developed for controlling outbreaks of disease, the appeals to the station for help made by producers of rabbits can not be fully answered, and large investments in the business are thus in jeopardy. It is planned to expand this line of research as rapidly as facilities are provided for the purpose.

Construction work has played an important part in the development of the station. The equipment and facilities now available include 4 inclosed breeding buildings, 4 outside rabbit runs, a new open unit with a total capacity of approximately 300 individual hutches, and 8 pens. This equipment represents a wide variety in types of construction, and considerable information regarding proper housing will result from a comparison of the buildings in use.

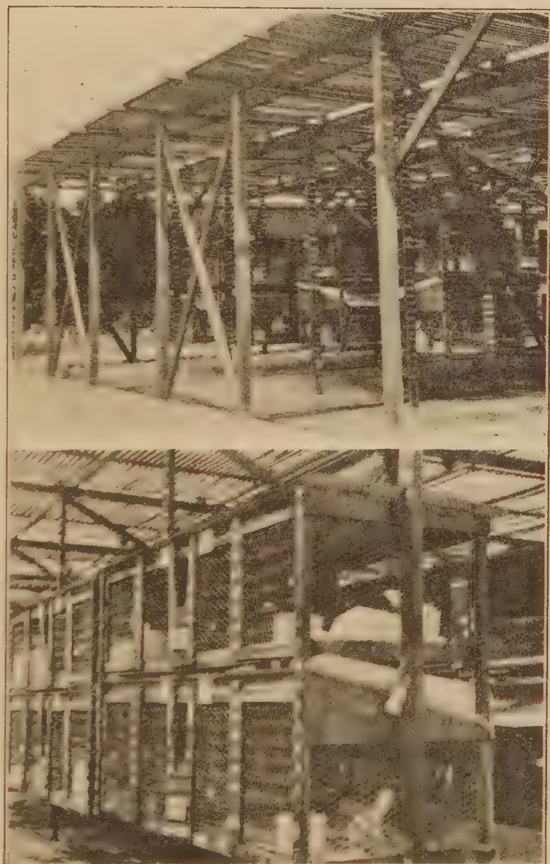

FIGURE 148.—Exterior and interior views of new type of open-air hutch unit for rabbits, used at the United States Rabbit Experiment Station, Fontana, Calif.

Fertilizer Experiments Conducted

A fertilizer experiment for the purpose of establishing a market value for rabbit manure is now being conducted by the Bureau of Biological Survey at the station, in cooperation with the Bureau of Chemistry and Soils and the county farm adviser. The results promise to be valuable not only to the development of the rabbit industry, but to fruit growers and gardeners as well.

Farm boys and girls in California have taken a keen interest in rabbits, and the director of the station has assisted agricultural extension agents in organizing 4-H rabbit clubs. Invitations have been sent to the schools of California to visit the station, and boys and

girls interested in 4-H club work have taken advantage of this opportunity to observe modern methods of raising rabbits for both food and fur and to learn of the profits that may be made in the industry.

FRANK G. ASHBROOK,
Principal Biologist, Bureau of Biological Survey.

RADIO Programs for Both National and Regional Use Adopted From the development of general information radio broadcasting by the United States Department of Agriculture during 1929, two particularly significant facts emerge: An expansion of the department's "chain" broadcasting program, and a move to correlate Federal and State broadcasting in cooperation with individual commercial stations. These developments may seem to be in opposite directions, but the apparent contradiction disappears in practice.

The chain program began in October, 1928, when the National Broadcasting Co. opened a network of 17 stations in the Middle West and Southwest to a 5-day-a-week program of 15 minutes from Washington. In July, 1929, the company expanded this network to 32 stations covering the country east of the Rocky Mountains, and undertook to provide entertainment and information features to balance a 45-minute program daily, except Sunday. The Federal Farm Board, the land-grant colleges and universities, and the great national farm organizations were invited to participate. This program, called the "National Farm and Home Hour," is broadcast from 12.45 to 1.30 p. m., eastern standard time (11.45 a. m. to 12.30 p. m. central standard time, and 10.45 to 11.30 a. m., mountain standard time). On Saturdays when the 4-H club, land-grant college, and farm-organization programs are sent, the Pacific coast stations of the National Broadcasting Co. are included in the network.

In this program of centralized broadcasting, which reaches an audience scattered over at least 37 States, speakers have to choose subjects having the widest possible interest. This has developed emphasis on broad economic and scientific trends. The speakers try to explain current developments in the farm-commodity markets. They summarize and interpret Federal crop and livestock reports, and give the essential new findings of research. In making seasonal reminders of approved production technic, they confine their remarks to practices which apply over wide areas. In short, the chain broadcasts are shaped to give the information that can best be given by the Federal authority. It is logical that this service should be centralized.

A Decentralized Type of Broadcasting

It is equally logical that another type of farm and home broadcasting be somewhat decentralized. This second type includes weather reports, market news, and information broadcasts in cooperation with individual radio stations. Weather and market news broadcasts have been decentralized from the beginning, and handled through the branch offices of the Weather Bureau and the Bureau of Agricultural Economics. Weather reports and market news dealing with facts of specific interest and value to the audiences of the stations are issued from these branch offices through cooperating radio stations.

In 1926, when the Radio Service of the department was organized, it was realized that farm and home information for release through

individual radio stations should have a more or less regionalized appeal. This was achieved by preparing broadcasts for five general agricultural regions. Such programs, prepared by a staff of five writers in the Radio Service, are now released through 164 cooperating radio stations.

In 1928 the Radio Service was invited by the radio committee of the Association of Land Grant Colleges and Universities (under the Smith-Lever Act of 1914, member colleges and universities of this association operate the State agricultural and home economics extension services) to cooperate in working out a system for correlating Federal and State extension broadcasting. The outcome was a proposal, submitted by the directors of extension and information of the department, for cooperation of the State extension services and the United States Department of Agriculture in releasing syndicate programs through commercial radio stations in each State. The radio committee of the association, at its annual meeting in 1929, recommended that its member institutions adopt the plan.

The proposed system as far as possible will decentralize extension broadcasting through individual radio stations. The Department of Agriculture will provide half the programs, and the States the other half. Thus duplication of Federal and State information will be avoided. In collaboration with the department, the State extension services will arrange schedules with cooperating broadcasting stations.

Pooling Information Resources

It is hoped in this way to make better use of the valuable broadcasting time offered for agricultural service by commercial radio stations. The information resources of the land-grant institutions and the Department of Agriculture will be pooled, so as to bring out the freshest and most useful information available. By December 1, 1929, the proposal had been accepted by more than half the land-grant institutions. The new system probably will be started by September 1, 1930. It is not designed to affect the work of the radio stations now operated by 19 land-grant institutions, but to provide, through the cooperation of commercial stations in those States and in the 23 others serviced by commercial stations, farm and home radio information services of maximum effectiveness.

The expansion, under Federal control, of chain broadcasting follows logically from the necessity of making interpretations of the rapidly changing agricultural situation available to farmers generally. Broadcasting under joint Federal-State control follows logically from the necessity of making available to each local group in agricultural America the specific scientific and economic facts that apply to the local problems of that group.

That the department and other agencies for agricultural improvement can send both types of information to nearly 2,000,000 radio-equipped farms is a tribute to the cooperative spirit of radio broadcasters. During 1929 the National Broadcasting Co. made available to the department, without charge, more than 100 hours of broadcasting time on each of 32 associate stations. More than 150 individual radio stations similarly gave more than 8,000 hours of broadcasting time to syndicate programs supplied by the department.

MORSE SALISBURY,
Chief, Radio Service, Office of Information.

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RANGE-FORAGE Grazing Should Leave Fifth or More of Plant Volume Those engaged in managing range lands constantly have to decide the extent to which the range plants should be utilized. It is impossible to suggest to them a basis for decision that will apply to all ranges. A method can be outlined, however, that will fit most cases.

The first step is to find out what species can be perpetuated on the particular range with reasonable use and management and about how dense a ground cover can be expected. The type of soil, available moisture, temperature, and other such factors must be considered. The species that should be perpetuated can be decided upon from a study of existing conditions if the species occupying the range grow there naturally. If overgrazing, fire, or some other disturbing factor has favored the growth of the plants present on the range in place of others that would occupy it if it had been left undisturbed, then the species that occupied the range before it was abused must be determined.

The next step is to ascertain which are the better forage species. Livestock rather consistently eat certain species in preference to others. Generally, a good forage plant is relished by livestock, is nutritious, has no bad effects, grows either abundantly or to a large size, or both, so that it makes up an appreciable proportion of the forage and holds its own well in competition with other plants. If, in addition, it is a good soil binder it has added value for watershed and soil protection. It is species of this kind that should be perpetuated and, therefore, upon which the management of the range should be based. Experience and experimentation have shown that range abuses, such as too heavy grazing, or too early grazing, result in the killing out of the better forage species and the coming in of inferior species. The livestock thus get less feed, and feed of poorer quality. Often poisonous plants are among the species that replace the better forage plants. Usually, also, depleted ranges are subject to erosion and contribute to floods.

Perpetuating Desirable Species

The next question is how to manage the grazing so that better forage species will be perpetuated in a vigorous condition. Protection from too early grazing and opportunity for the plants to produce sufficient seed are important. The food used by the plants and stored in them is synthesized in the leaves. Therefore, it is essential that there be a fair amount of leafage all during the growing season. Species differ in the amount of leaves and stems they can lose and still remain vigorous. As a general rule, however, about one-fifth of the volume of the herbaceous species should be left at the end of the grazing season. If more is taken the plants will weaken and die. A few species will not endure even this degree of utilization. Blue-bunch wheatgrass (*Agropyron spicatum* or *A. inerme*), for example, apparently will not continue to do well if more than half, or at most two-thirds, of the plant volume is utilized each year. In the case of browse species, enough of the new twig growth should be left each year so that there is an average of one or two lateral buds to the twig. Heavier use results in hedged, scrubby plants with many dead limbs and twigs, and eventually in death.

Where the soil is loose, the slope steep, the range partly depleted, or where other special conditions exist, the degree of utilization must be less than that indicated above.

The most important points are to perpetuate the better forage species and leave one-fifth or more of their volume each year. If this is done one need not be concerned about the less-palatable species, for it is certain they will be unharmed. Nor need one ordinarily (very steep slopes and loose soils are exceptions) be concerned about injury to soil, watershed, or timber reproduction, for on ranges where the plants are properly utilized injury to other resources is rarely found.

Ernest Winkler,
Assistant District Forester, Forest Service.

RANGE Stocking Must Be Conservative to Allow for Poor Years Few things have as vital an effect on the range-cattle industry of the Southwest as the variation in yield from year to year of perennial range grasses and the consequent unevenness in the capacity of the range to support livestock. Over most of the region the native perennial grasses are the basis of the forage supply for at least a part and in many cases a very considerable part of the year. Other vegetation may serve as a supplement and occasionally is of extreme importance in times of drought; but its failure does not ordinarily cause the same degree of concern as a failure in the perennial grass crop. A study of the annual yield of perennial grasses made by the Forest Service at the Santa Rita Range Reserve in southern Arizona has proved of considerable value in pointing out the need for a strictly conservative basis of stocking if this important forage is to be maintained on the range in sufficient quantity.

The data on yield have been collected for six separate years, 1921, 1922, and 1925 to 1928, inclusive—years that averaged from fair to excellent in production. In the drought year, 1924, practically no growth was produced on the area studied. During the six years of study six important grass species on a given area showed an average high yield of 176 pounds in the best year, as compared with 52 pounds in the poorest year.

In the foothill type of range, four important grass species showed an average variation in yield on a given area of from 21 pounds per acre in a poor year up to 121 pounds in a good year. The 6-year average in the foothill type was 70 pounds; and a summarization of the data for the period showed that for three years the yield was below the average, for two years very slightly above, and for one year appreciably above.

In the mesa type, where two of the most important grasses were studied, the yield on a given area varied from 114 pounds in a poor year up to 260 pounds in a good year. The 6-year average yield in this case was 205 pounds. The yield in two of the years was very much below this average, in two slightly above, and in two appreciably above.

Individual species in both types showed generally a very much greater variation, the yield in a good year being from four to six times that in a poor year.

Conservative Stocking Essential

With such great variations in yield and no possible way of estimating them in advance, it is absolutely essential to stock the range on a strictly conservative basis. As determined and applied on the Santa Rita Range Reserve, this means a rate of stocking that will not exceed 75 per cent of the number of grown stock that an average year would indicate as proper for the range. In the case of a breeding herd, where calves are ordinarily held over to the age of yearlings, the total permissive stocking, including calves, may be as high as 85 per cent of what the range will carry in an average year, with definite provision for selling off sufficient young stock to bring it down to the 75 per cent basis at the first sign of any impending shortage of feed. Such stocking will apparently meet the ordinary years of short feed without any adjustments in numbers of cattle at all, and in the most extreme droughts will greatly minimize the number of cattle that have to be fed or removed from the range in order to provide feed for the remainder.

In the good years it may appear that a lot of feed is going to waste, but extensive study has shown that the apparent waste is more than made up by increased vigor and growth during the succeding year and particularly so if the latter happens to be a drought year. Likewise, any surplus of forage left over at the close of a good year may be utilized in the year following if forage growth in that year happens to be either late or deficient.

MATT J. CULLEY,
Director, Santa Rita Range Reserve, Forest Service.

RANGES Are Made Usable by Hauling Water for Livestock

An adequate supply of water for livestock, whether present naturally or developed artificially, is essential to the use of any range or pasture. On the Deschutes and Ochoco National Forests, which border the "high desert" region of central Oregon, large areas of excellent summer range remained totally unused until within the past few years because they were without water for stock. The Fort Rock district of the Deschutes at lower elevations merges into a "desert," a high pumice-covered plain. Here, and on a portion of the Ochoco Forest, there is light to medium winter snowfall but no consequent water in summer. As the snow melts the water is absorbed by the loose pumice soil that overlies the porous lava rock, in some places to a depth of many hundred feet, and for miles no evidence of watercourses is found. In spite of these conditions the areas are covered for the most part with an excellent stand of mature western yellow pine averaging 14,000 board feet per acre, under which is found a luxuriant growth of secondary vegetation consisting mainly of bitter brush (*Kunzia tridentata*), Idaho fescue (*Festuca idahoensis*), June grass (*Koeleria cristata*), wheatgrass (*Agropyron spicatum*), and needle grass (*Stipa occidentalis*). Long periods of summer drought make this material highly inflammable, and the areas are subject to destructive lightning fires. For years the Forest Service has sought means of reducing the fire hazard and converting this latent grazing resource into useful animal products.

As far back as 1908 the Government experimented in drilling wells on these areas. Except in one case, the drilling was unsuccessful. A

plan was then proposed for tapping the Paulina Lakes, piping the water for some 25 miles, and distributing it over the dry territory to the south and east; but engineering difficulties made the cost prohibitive. Finally, when roads had been built for fire protection, the problem of making this large body of excellent summer range available for pasturing sheep was solved through the use of the ubiquitous truck and portable watering troughs.

In 1918 an enterprising sheepman began hauling water some 10 miles to his dry range on the Deschutes area. A year or so later water hauling was started on Dry Mountain range on the Ochoco Forest. These examples proved so successful that others followed rapidly. Out of a total area of 402,096 acres wholly unused in 1916, to-day 306,000 acres are profitably used by livestock. This water development is described in detail in unpublished reports by Assistant Forest Supervisor W. O. Harriman and Ranger E. W. Donnelly.

FIGURE 149.—Loading water from receiver tank into tank trucks at Forest Service well. This water is hauled about 10 miles and unloaded as shown in Figure 150

The water is supplied by 14 wells located in a semicircle on the borders of the area and southeast of it. The longest haul is 29 miles, the shortest 4 miles, and the average about 8 miles. Four stockmen haul all or part of their water from irrigation ditches 18 to 25 miles from their range; three are supplied from the Government well at Cabin Lake.

Equipment Used

Several different types of hauling equipment have been developed, from a 1-ton truck with a 250-gallon tank to a 3-ton truck having a 1,000-gallon tank equipped with a light centrifugal pump that is useful both for filling the tank and for emergency fire fighting. For four trucks having a tank capacity of 460 gallons each the cost averaged $1,332.58 per truck. A set of nine metal watering troughs cost $191.25, making the cost of the whole outfit $1,523.83. Capitalizing this investment over a 10-year period made a cost per head per month of 15 cents. The cost of hauling was found to average 5.2 cents per head per month. On long hauls costs were as high as 9.3 cents; on hauls of 8 miles or less they were held as low as 3 cents. All normal costs to the operator are fairly covered by 18 cents per head per month. Incidentally, the trucks are used on home ranges during the winter for hauling feed and supplies; only a part of the cost, therefore, is properly chargeable to water hauling.

Heavy trucks with 1,000-gallon tanks were found ordinarily too heavy for the loose dirt roads, and stockmen generally are favoring a medium-weight truck with a tank capacity of from 300 to 450 gallons.

Such an outfit can be loaded in from three to six minutes. The galvanized-iron watering troughs generally used are 8 feet long, 14 inches deep, and 18 inches wide, and flare at the top so that they "nest" and are easy to move. Eight to twelve of these are placed near the camp.

Water hauling has converted what was once virtually a timbered desert into excellent range that supports 25,000 sheep and 3,000 cattle the summer long. Moreover, the lambs from this range weigh 71 to 93 pounds when marketed, and their fat is of firm quality. Water hauling coupled with grazing use also bids fair to solve one of the knottiest problems of fire protection found on any forest of the Northwest.

FIGURE 150.—Filling the watering troughs on the dry range while the sheep are away feeding. This area is typical of the dry range the use of which is made possible by this type of water development

Method of Watering

Cattle are watered from stationary troughs located at or near the wells, but it is customary to haul water to the sheep daily or on alternate days, and to move their watering troughs frequently. Some of the bands water at night, the filled troughs awaiting the sheep as they come into camp; the practice that appears to be best for both sheep and range, however, is noon watering, with nightly change of bed ground and consequent frequent change of watering place.

In order to save delay in filling the tank trucks it is necessary to store water at the wells. This storage is also an asset in case of forest fire, as are the sheepmen's tank trucks.

The amount of water consumed by the sheep has been found to vary widely, largely in accordance with the type of feed, weather conditions, and management of the stock. Some herders insist that their flocks require water every day, while sheep in other bands seem content and do equally well when watered every second or third day

only. Ewes with lambs ordinarily take much more water than dry sheep. Difference in requirements is illustrated in the case of one stockman with two bands using adjoining and similar range, one of 1,100 ewes with 700 lambs and one of 1,200 ewes with 1,100 lambs. The first band required 800 gallons of water per day, or 0.44 gallon per head per day; the second required 1,200 gallons, or 0.52 gallon per head per day. The average requirement for eight bands of ewes and lambs using the Deschutes range was 0.36 gallon per head per day, and on the Ochoco dry range the average requirement was 0.375 gallon per head per day. For a band of dry sheep watered at the Cabin Lake well the average quantity used daily was 0.26 gallon per head.

With few exceptions one camp tender and water hauler has little difficulty in supplying the daily water needs of two bands of sheep, time being allowed for moving the camp and watering troughs to fresh feed.

This type of water development is an up-to-date version of "the house that Jack built." The extreme fire hazard necessitated the building of roads, roads permit the hauling of water, this makes possible the grazing of sheep, and the consumption of forage by the sheep reduces the fire hazard.

DOUGLAS C. INGRAM,
Associate Range Examiner, Forest Service.

RED-CLOVER Problems Turn on Production of Good Domestic Seed The problem of growing red clover in the United States is essentially a problem of seed supply. Not that it is enough to have good seed. The soil on which red clover is to be sown must be in good condition, must be adequately supplied with lime, phosphate, and potash, and must be well drained. These requirements are now so well known that no extended exposition is necessary, and they are parts of the whole problem only where they are not all met. Work done by several State agricultural experiment stations has shown that where land is long cultivated the supplies of lime and phosphate tend to become depleted, and red clover is the first crop to feel and to show this deficiency in a lack of vigor and in declining yields.

However, when lime, phosphate, and potash deficiencies, if they exist, have been corrected, there is still no assurance of good stands and good yields unless the right kind of seed is used. Much has been written about the need of pure seed, and properly so; but while this emphasis on mechanical purity and freedom from weed seeds was being made, sight was lost of the fact that not all clover seed was of the same stock, variety, or strain. It has now been learned that the adaptability of a given strain or variety of red clover to the conditions under which it must grow may be very much more important than the mechanical purity of the seed.

The cultivated red clovers have arisen from the wild species which occurs nearly everywhere in Europe and in western Siberia and which is a rather variable plant both as to size and hairiness. In the course of time two groups of varieties have been developed from the wild species, the early double-cut varieties and the late single-cut varieties. Seed of both groups was brought to North America during the seventeenth and eighteenth centuries, and from these early stocks have been

developed our early or medium red clover and our mammoth red clover.

In the course of some 200 or more years of growth under American conditions our red clovers have become adapted to those conditions and have developed into varieties distinct from the European red clover. To-day our red clovers differ from the European varieties in their greater hairiness and in the fact that the hairs stand out at right angles to the stem instead of lying flat against the stem.

Possibilities of Damage

In the United States red clover usually stands for two seasons—the season of seeding and the season of harvesting. During that time the clover plants are subject to certain possibilities of damage, such as

FIGURE 151.—In May, 1928, at Arlington farm, plots seeded to imported European seed, right, had little but weeds. Plots seeded to Ohio seed, left, had a good stand. The stand of all was equally good in June, 1927

severe cold, heaving, diseases, and insect enemies. Any or all of these may reduce or destroy the stand or may injuriously affect the recovery after the first cutting so that there is little second cutting or, in some cases, none at all. When any of these things happen, red clover is a failure or a partial failure, and it has been found that such failures or partial failures are more likely to occur when red-clover seed of a foreign variety is used than when seed of the American variety is used.

It is not possible to say how much red-clover seed is used annually in the United States, but from the figures of home production plus imports and less exports it may be concluded that between 60,000,000 and 70,000,000 pounds of red-clover seed are sown annually in the United States. Of this quantity about 17 per cent is imported seed. The average annual production of red-clover seed for the years 1922 to 1928, both inclusive, was a little more than 53,000,000 pounds, varying from a low figure of 38,000,000 pounds in 1924 to 79,700,000 in 1922.

The average imports have been about 11,000,000 pounds; consequently the average production in the United States would have to be increased by more than 21 per cent if there were to be domestic seed enough to replace the present importations.

The shortage of United States grown seed would not be of so great importance if good crops could be obtained by the use of foreign seed. The yield records of experimental plots where foreign seed from different countries has been tried in comparison with domestic seed show that foreign seed does not generally give as good yields as domestic seed. This is especially true of the seed that has been imported in the largest volume. Until the seed-staining provision of the Federal seed act went into effect, large quantities of red-clover seed were received from Italy, and this seed was found to be especially unsatisfactory. At present the largest volume of red-clover seed coming to the United States is shipped from western Europe, and this, too, has proved inferior to the domestic seed, though sometimes giving fair yields of hay on the first cutting. At Ames, Iowa, in 1926–27, 296 different lots of imported seed were tested, and in every case the yields fell much below the yields from Iowa seed. In 1927–28 tests were made at the Arlington Experiment Farm, Rosslyn, Va., and at North Ridgeville, Ohio. At the Arlington farm the average yield from 50 lots of imported red-clover seed was 37 per cent of that from domestic seed, while at North Ridgeville 69 imported lots yielded 72 per cent of the yields from domestic seed. Naturally, among these imported lots some were better than others, a few nearly equaling in yield the average from plots seeded to domestic seed. A very large proportion, however, were near failures.

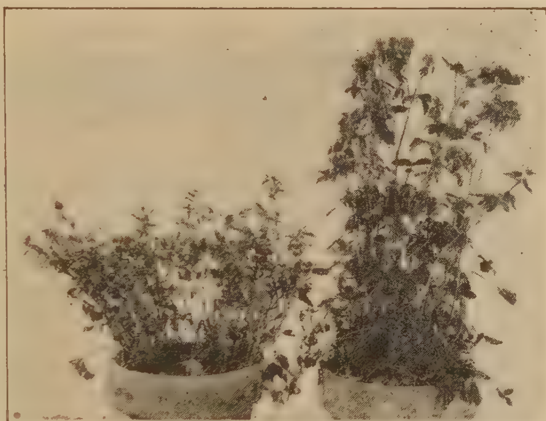

FIGURE 152.—Showing poor second growth of European red clover, left; and good growth of American, right

Increased Domestic Production Necessary

This fact that the great bulk of foreign-grown red-clover seed is unsatisfactory for use in the United States, together with the shortage of domestic seed, makes the matter of increased production of domestic red-clover seed the outstanding problem in a consideration of red clover in the United States. Besides the fact that domestic red-clover seed generally produces plants adapted to conditions in the clover area of the United States, account must be taken of the fact that certain diseases may seriously damage the clover crop. This is especially true of the southern form of anthracnose, and the only remedy for these conditions is the development of resistant strains. Such a resistant strain has been developed in Tennessee, and the use of seed of this strain is to be advised wherever the southern anthracnose disease is

prevalent. The production of more seed is necessary in order that this strain may be more widely used.

While an increase in the production of red-clover seed in the United States is needed for the best interests of agriculture, it must not be forgotten that this increased production should represent the best strains only. At present some sections are producing red-clover seed little more desirable than foreign seed. When increased production is planned, care should be taken to make sure that the seed stock comes from a strain with a good record of production.

In the United States there are two main centers of red-clover seed production, with some areas of minor importance. Most of the red-clover seed in the United States is produced in the North Central States from Ohio to Iowa and the Lake States, but most of the seed produced in these States probably remains at home; that is, it is used

FIGURE 153.—European clovers are often destroyed by anthracnose. Stand in April, 1926, of imported central European seed at right; Virginia seed at left

locally and does not enter into trade in as large a proportion to production as is the case with seed produced in Oregon, Idaho, and Colorado. The combined production of Oregon and Idaho is from 7.5 to 19 per cent of the total production in the United States. There would seem to be no reason why the production of red-clover seed in all the intermountain and North Pacific Coast States should not be increased to a point where the importation of foreign seed becomes unnecessary.

Wherever the production of red-clover seed is attempted, however, care should be taken to begin with good stock. In some parts of the United States foreign clovers do well as hay producers, but when seed is harvested and sold in the eastern consuming section the result is the same as when foreign-grown red-clover seed is used. The trouble is with the variety. Increased red-clover seed production is essential, but the seed must be of a good stock or the red-clover problem in the United States will not be solved.

A. J. PIETERS,
Senior Agronomist, Bureau of Plant Industry.

REFRIGERATOR Economy Is Not Increased by Blanketing the Ice Sometimes the housewife, desiring to practice economy, wraps the ice in her refrigerator with a blanket of paper or other material. Ice companies and refrigerator manufacturers as well as various educational agencies have protested against this practice as harmful and unscientific. It is the melting of ice which absorbs heat within the refrigerator and thus cools its contents. To be sure, anything that hinders heat from entering the refrigerator itself is advantageous—that is why a cabinet should be well insulated—but anything that tends to prevent the heat within the refrigerator from being absorbed by the melting ice must have a harmful effect, as it causes higher temperatures and accelerates bacterial growth. Hence, if the housewife feels that she must do something to keep down ice meltage, she should blanket her whole refrigerator, not the ice.

An important factor in the efficient cooling of the refrigerator is the air circulation within it. For example, in a cabinet of the side-icer type, the air near the melting ice is cooled and so becomes denser. It therefore moves downward into the milk compartment while the air in the large food compartment, which has been warmed by absorbing the heat leaking in through the walls, moves upward and returns to the ice chamber to be cooled again. Thus anything that blocks the air circulation is likely to prove harmful, and wrapping the ice may easily have just this effect.

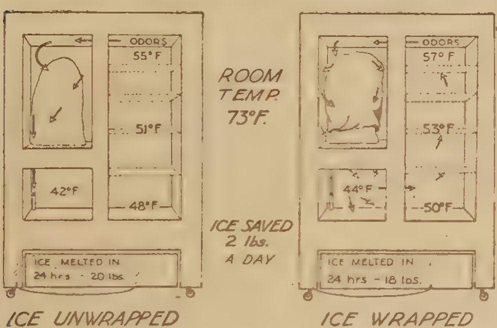

FIGURE. 154.—Effect of blanketing ice upon ice meltage and food space temperatures in a household refrigerator

At the Bureau of Home Economics, as part of a study in household refrigeration, two stock refrigerators of the same lot were placed near each other in the same room and were treated as nearly alike as possible, except that in the first cabinet the ice was blanketed carefully each morning by being wrapped in six thicknesses of newspaper while in the second cabinet the ice was not wrapped. These refrigerators were of the side-icer type, having 100 pounds ice capacity, and about 6 cubic feet of food-storage space. Room temperature, refrigerator temperatures at four places, and ice meltage were determined. In icing and re-icing the boxes, the cakes of ice were made as nearly alike as possible. The food space was empty except for the instruments necessary for measuring temperatures. In order to eliminate the effect of any possible difference in the two boxes, conditions were reversed after a suitable length of time, that is, the ice in the second cabinet was wrapped and that in the first was not wrapped.

Saving in Ice Negligible

The diagrams in Figure 154 show the average results of this experiment. The saving in ice was about 2 pounds a day, which would cost about 1 cent. This slight saving hardly compensates for the labor

involved in wrapping the ice, and, if newspapers are used, for the annoyance of removing soggy bits of paper, which of course must not be allowed to clog the drainpipe. As to the temperatures, wrapping the ice in this manner caused an average rise of about 2° F. in each case. This at first sight may not appear so very large, but even 2° may make an appreciable difference in the length of time that food remains wholesome, and often may easily make the difference between food that is fit for human consumption and food that must be thrown away.

Other methods of wrapping may produce slightly different results. For instance in a preliminary trial a "paper blanket" designed for this purpose and offered for sale in stores was used. This had surprisingly little effect either on the ice-melting rate or on the temperatures. E. H. Parfitt, at Purdue University, has described somewhat similar work. He used three thicknesses of newspaper and observed slightly smaller effects than those described here as produced by six such thicknesses. He also observed that butter absorbed less flavor from fish placed in the same refrigerator when the ice was not covered than when it was covered. Some volatile odors are absorbed by the film of water on the surface of the ice cake and are carried down the drainpipe, but wrapping the ice interferes with this process.

Considering the smallness of any possible financial gain from wrapping ice in a refrigerator and the various ways in which harm may be done by this practice, it appears that the housewife should find other means of saving money. The purchase of a well insulated refrigerator is true economy in the long run, but if the household budget does not permit such an expenditure at present, it is better to wrap the entire refrigerator, not the ice.

MILDRED B. PORTER,
Associate Physicist, Bureau of Home Economics.

RESEARCH Increasingly Necessary as Means of Continued Progress Fundamental research is the attempt to get at the inner secrets or true explanations of "things" or "phenomena," as the scientist usually calls them. The outward expressions of things are the first to attract attention. We see a tree. Then we begin to observe its size and manner of branching; then we study the arrangement of buds and leaves and flowers; then the general structure of these various parts. This leads on to the more minute structure as revealed under the higher powers of the microscope, magnifying from 1,000 to 10,000 times the actual size. What the eye could not see the microscope reveals. The various tissues are resolved into cells; each cell again has its peculiar structure—cell wall, protoplasm, nucleus. These again are found to have complex structure until we come down to molecules and atoms and chemical reactions more intricate than anything we know of in our laboratories.

In this progress toward the ultimate we soon pass beyond what we can see with the highest power of the microscope, and we must then depend on chemical, physical, and biological reactions. How does the green leaf cell make sugar and starch from the carbonic acid gas of the air and the energy of sunlight? What part of the sunlight is used, and under what conditions does the synthesis take place? We know

much about this, but only the more easily observed phenomena. It still remains to interpret these processes in the light of physics and chemistry and our new knowledge of the electric constitution of the atom. "Reactions" take place in the plant cell that scientists have not yet been able to bring about, outside of the cell, in laboratories.

When we have all the facts and processes by which the plant cell makes starch and sugar, proteins and fats, enzyms and vitamins, we may be able to utilize this knowledge to very great advantage. Certain bacteria, for example, are able under certain conditions to fix atmospheric nitrogen. The immense stores of nitrogen in the air are not available to us except through the action of certain bacteria or by expensive chemical processes; yet our lives depend on having a proper supply of available fixed nitrogen. The bacterial cell does the job much more efficiently than we can do it in our laboratories. But how? That is the question, the answer to which may mean very much to the future of the human race.

We are familiar with the fact that many diseases of plants and animals are due to disturbances produced by the attack of other plants or animals, bacteria, protozoa, insects. Some of these disease-producing agencies are so small that they can not be seen under the microscope, and like atoms they must be studied from their reactions.

Mosaic-Disease Problem Still Unsolved

The so-called mosaic diseases, attacking many of our most important crops—corn, clover, vegetables of many kinds, wheat, fruit, etc.—cause millions of dollars loss annually. The infective material appears to be carried from plant to plant by certain species of insects, plant lice, and leaf hoppers.

Just what is this infective material? Is it a living substance or is it intermediate between living and ordinary chemical substance, like some of the enzyms, or a peculiar form of semiliving matter like "bacteriophage," which means little except that it refers to a substance of simpler structure without the power of reproduction of the ordinary type, but which under certain stimuli develops in plant and animal cells and has the power to produce certain disease lesions. When we solve this question we will have the key to some of the most obscure biological and pathological questions. This new knowledge may be of immense practical value, and on the other hand it may have no immediate practical application. At any rate it will be progress in the right direction.

We find that "fertile soil" is more than a mixture of certain physical and chemical substances. It is a living complex of inorganic and organic things, chemical, plant and animal, all having important relations to the formation of what we call soil, and to the changes it undergoes when we cultivate it. What are these relations, biological, chemical, and physical, and how may we control them to our advantage?

Here lie some of the most important questions involved in the problem of feeding the human race when the pressure for food becomes much greater than it now is. That time is not far distant. We are using up the great natural resources of fertility. How may they be most economically replaced for the use of our children throughout ages to come? We must find the key that will unlock the immense stores of atomic energy in the materials we call rocks, minerals, and

soils, and the gases of the air, and reorganize them into forms available for our use. This is what plants have been doing through aeons of time. Great progress in this direction has been made in the last half century. We are on the right track, but we must speed up if we are to have the knowledge we need in time to get it into use before the hard times come.

Applied Science Gets Credit Due Pure Research

Although it is generally recognized that fundamental or pure research is the root out of which applied research grows and that it is absolutely essential to the growth of applied research, yet pure research has little standing with those who raise and dispense taxes. It is not generally recognized as one of the things to be provided for as a public necessity. The reason for this is to be found in the attitude of investigators themselves in not making it clear to the public in general just how the great triumphs of applied research were made possible. We are inclined to give the credit to the one who gives us the finished product rather than to the ones who made the product possible.

Should we leave fundamental research to the universities and privately endowed agencies? It is true that these agencies in the past have been the principal source of fundamental concepts. If their work is properly financed they will continue to be productive. They must in any case train the men who are to carry on research in the future, and this can be done only where fundamental research is in progress.

An effort is now being made through the National Academy of Science and the National Research Council to provide funds through endowment for the promotion of fundamental research in educational institutions. The great privately endowed foundations have done and are doing much in the same direction, as well as in the development of special institutions like the Rockefeller Institute for Medical Research, the Carnegie Institute, the Boyce Thompson Institute, the Smithsonian Institution, etc.

In the field of applied research the great Government laboratories of the Department of Agriculture, Geological Survey, Coast and Geodetic Survey, the Bureau of Standards, and the State experiment stations are outstanding in importance and accomplishment. The time is at hand, however, when progress demands more attention to fundamental research by these great Federal and State agencies.

Industry has recognized this and is itself financing such work in addition to its applied research. A matter, however, of such great importance to the welfare of humanity should not be left to private initiative but should, in part at least, be undertaken by government. This is especially true in regard to food supply and in regard to the health of man and his domesticated animals and plants, that is those activities that deal with man's necessities as distinguished from business.

Research can not be turned out like macaroni or newspaper copy or threshing machines. It is a search for the unknown. The trail is frequently winding and difficult to follow and easily lost. Patience and persistence are necessary to success. Knowledge of what is already known and ability to reason soundly and do constructive thinking are essential in such work.

The life of the world in the final analysis absolutely depends upon the chlorophyll-bearing plant cell, which is able to utilize the energy

of light for the manufacture of starch, sugar, protein, which all living organisms, plant and animal, must have for food.

Agriculture has its real basis in the cultivation of these plants. Every means of protecting and improving them and increasing their efficiency as manufacturers of food and fiber is of immense importance to agriculture and therefore to mankind as a whole.

Agriculture's Debt to Science

Agriculture has advanced exactly in proportion to the expanding of man's knowledge in these respects. A safe and plentiful food supply is the foundation of peace and prosperity and the object of the research functions of the Federal Department of Agriculture and the State experiment stations. Great advances have been possible along the line of reducing the various aspects of agriculture to a more scientific basis, especially through the utilization of the sciences of botany, zoology, chemistry, and physics. This has given us a better understanding of plant and animal nutrition, growth, and reproduction improvement of plants and animals through selection and hybridization, securing varieties resistant to disease and to other limiting factors, or otherwise better adapted to our needs. This alone has more than doubled our potential food supply and is our main hope for the future when world populations have greatly increased, and we are not worried about temporary surpluses. The worry then will be "Are we going to have enough?"

To be certain that our children have enough so that they shall not be harassed by fear of famine or undernutrition, we must lay the foundations now. It is possible that if we can unravel the chemistry and physics and biology of the activity of the plant and animal cell we may be able to better aid their activity or perhaps duplicate it by direct chemical means. This will never be accomplished, however, except by the most searching pure science research.

Studies of this kind have already yielded important results. The effect of sunlight or equivalent radiant energy in the ultra-violet part of the spectrum on the production and functioning of so-called vitamins is opening up a new world in health and nutrition.

The discovery of the control of growth function through length of light exposure opens up a new field of control which has already been put to practical use. Gardeners and plant breeders can bring plants into flower and fruit at will by proper exposure to light and darkness.

The thing most needed now is a public understanding and support of this type of research in universities and in State and Government laboratories.

A. F. Woods,
Director of Scientific Work.

RICE-GRADING Service Available in South and in California Federal-State grading service for rough rice, brown rice, and milled rice is now available in the South and in California. Grades have been used for several years by several of the rice-marketing agencies in these regions, but not till the 1928–29 season has the grading been federally supervised.

The respective State departments of agriculture that perform commercial rice grading employ graders to do the grading work, but these graders are licensed by the United States Department of Agriculture, and their work is supervised by the Federal department.

Not all the grading agencies that have adopted the Federal standards are now in formal cooperation with the United States Department of Agriculture. Hence, if a buyer or a seller of rice wishes to obtain a Federal-State certificate, he must apply to a grading agency that is under the supervision of the Federal department.

The Federal-State rice-grading service in California in the last year has been used by a growers' association in ascertaining the true quality of the rough rice sold through this association; and also by dealers and millers in the marketing of rough rice, brown rice, and milled rice in distant domestic markets and in foreign countries.

During the 1928–29 season a Federal-State rice-grading service was available in the South for rough rice only. It was used by a large growers' association which is a rough-rice-selling organization. Rough rice valued at more than $4,000,000 was graded for this association. The grade certificates were used extensively for advising members of the association as to the true quality of their product, for the guidance of the sales managers in selling rough rice, and in connection with some sales of rough rice which were made to foreign countries.

Service Extended in September, 1929

On September 1, 1929, the Federal-State grading service in the South was extended to include brown rice and milled rice. The Texas Department of Agriculture adopted the official United States grades for milled rice and brown rice, and the grader was licensed by the United States Department of Agriculture to grade milled rice and brown rice.

The Federal-State rice-grading services in California and in the South are not compulsory, but may be used by all who wish to have rice graded by a grader who is working under the direct supervision of the United States Department of Agriculture and who must grade strictly in accordance with the official Federal standards.

Federal-State grade certificates for rough rice are of value to growers and growers' associations because they indicate clearly the quality of each lot and because they show not only the premium qualities but also the defects in each lot. Thus the grower learns in what way he should attempt to improve future crops. The grade certificates constitute definite records of the quality of rice available for sale by an association and the quantity of each grade on hand. The certificates for rough rice especially facilitate trading between the association sales managers and the buyers of rough rice. The Federal-State grade certificates for brown and milled rice are of especial value in connection with sales of these rices made to domestic and foreign buyers when the sales are made by grade and the contracts call for grade certificates.

W. D. Smith,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

RODENT Control Aided by Mixing Bait at Cooperative Stations

When it is considered that injurious rodents are responsible for a loss of more than 25 per cent of farm crops and range forage in many localities and an average loss exceeding 10 per cent of the crops and forage over large areas, the importance of undertaking measures for their control in a business-like manner is evident to all concerned. It is essential to efficient control that a supply of poison baits, properly prepared, be available at opportune times in labeled containers, and at reasonable prices. Part of this need may be met through the individual efforts of farmers, orchardists, and ranchers. Such efforts, however, are time consuming, even though the individuals are in position to prepare baits that are really effective, and, compared with quantity production on a cooperative basis, the cost is always high.

Extensive experimental work conducted by the Bureau of Biological Survey has developed the fact that the most effective bait for poisoning ground squirrels, prairie dogs, field mice, and certain other rodents is made from good, clean, specially steam-rolled oats. To prepare the bait properly requires knowledge, training, and mechanical equipment, and to have the bait available at the opportune time requires storage facilities and efficient distribution. For the sake of safety, poison baits must be kept in strong containers with warning labels attached. This requires the requisitioning of special bags or other containers that can be had at a reasonable price only by quantity buying. To produce poison baits in large quantities and at low cost, therefore, cooperative action becomes necessary. Under the guidance of the Biological Survey cooperative bait-mixing stations have been established in several districts of the West where the control of injurious rodents is of great economic importance. Some idea of the work of these stations may be gathered from an account of the operation and accomplishments of the station established in Idaho. This station is the best equipped of the number, and its operations have been conducted on a larger scale than the others.

FIGURE 155.—Poison-bait mixing station operated by the Bureau of Biological Survey for rodent-control campaigns in Idaho; exterior view, with station truck loaded with bait ready for distribution to cooperators

Equipment of Station

The station in Idaho was established in 1927 at McCammon, a central point for distribution of bait, with good railroad facilities and highways. Suitable buildings were leased and machinery and equipment bought in a cooperative undertaking between the Bureau of Biological Survey and the University of Idaho. The plant is equipped with an electric motor and motor-driven roller, especially designed steam cylinder, recleaner, drying fan, and elevators, and with a bag-

ger, a steam boiler, a steam cooker, and other necessary facilities. With these it is possible to steam-roll, reclean mix, dry, and sack about 20,000 pounds of poison bait a day, and approximately 200,000 pounds of oats or mixed bait can be stored at the plant.

Materials used in preparing the bait for cooperators are bought in large quantities by means of a cooperative revolving fund. Oats are purchased in carload lots, strychnine in quantities of 2,000 to 10,000 ounces, and other materials also at wholesale rates, thus making it possible to profit by the lowest possible prices obtainable. The actual cost of preparing the poison baits is prorated on the pound basis, and the bait is sold to cooperating farmers, orchardists, and ranchers at that price. The proceeds from sales are deposited in the cooperative revolving fund, which in this way is continuously replenished, permitting new purchases and sales.

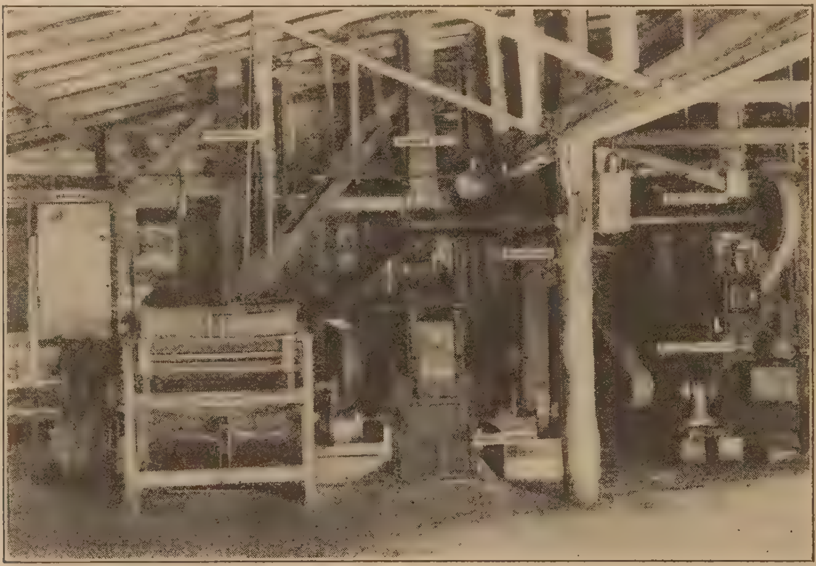

FIGURE 156.—Interior view of poison-bait mixing station, showing hopper, steam cylinder, roller, recleaner, and bagger, from each of which the grain is passed to the next through elevators and chutes, before treatment with poison

The station is operated by the Bureau of Biological Survey, and this fact insures that the bait shall be prepared by trained men in accordance with the best methods evolved through research. The mechanical operation of the plant is briefly described as follows: The whole oats, dumped into a hopper, are elevated to a steam cylinder, wormed through this cylinder, which is filled with "dry" steam at 80 pounds pressure, and fed into the roller; from the base of the roller the steamed, rolled oats are elevated into the recleaner, and from the recleaner they are elevated into the bagger. All these operations are by machinery and in the order stated, before the grain is mixed with poison.

The whole oats are passed through the steam cylinder before rolling so that in the rolling process the hulls may be slightly opened, permitting the poison to penetrate to the kernel. Experiments with groats and hull-less oats have been carried on to learn whether by their use it would be possible to do away with the steam-rolling process. It

was found, however, that these are by no means so acceptable to the rodents as are oats with hulls, for the tests indicated that the rodents prefer to hull the oats to get at the kernels. Whole oats, therefore, are used, with the hull slightly opened to admit the poison into the kernel.

After the steam-rolling process the oats are recleaned to discharge loose hulls, dirt, chaff, or other materials not acceptable to rodents, so that these may not absorb and waste the poison.

Mixing and Distributing the Bait

The next step is mixing the bait and the poison, which usually is a starch-paste mixture, containing gloss starch, strychnine, saccharin, and sirup, with a small quantity of water, the proportion of each depending upon the rodent against which operations are directed. The starch paste is quickly made in the steam cooker. The poison mixture is then poured over the steam-rolled oats and mixed either by machine or by hand. Then liquid paraffin is added in order to make the bait durable and render it to a certain extent rain-proof when exposed to the weather. The poison bait is dried to the right degree by means of an electric fan, so that it will not mold or heat when sacked. It is then put into strong, properly labeled bags of various sizes and is ready for distribution where needed in rodent-control operations.

The distribution of sacked baits in Idaho is usually made from the plant by rail shipment or by means of a motor truck, which is part of the equipment of the station. In many instances the bait is delivered from the plant directly to the user; but it usually is trucked to convenient points in the counties or communities, from which it can be distributed to farmers through the offices of the county extension agents. Ready-prepared material of uniform quality thus reaches the user, at a price averaging about 20 per cent lower than if he prepared it himself and in a condition far more acceptable to the rodents than would be the home-prepared product.

Accomplishments of Mixing Plant

The station in Idaho during the fiscal year 1929 steam-rolled 436,350 pounds of oats, of which 194,145 pounds were shipped to other mixing stations and 242,205 pounds were made into poison bait—170,055 pounds for use in Idaho and 72,150 pounds for other States.

The saving to the Biological Survey and its cooperators during the year in the cost of poisons and other materials through quantity buying and operation of the station amounted to $23,560. Most of this saving accrued to the cooperators, as they use the larger proportion of the poison baits. In addition, however, there was an aggregate saving of more than six months' time of county agents in Idaho, by reason of their not having to mix the baits in their respective counties, as was necessary before the station was established; and also an aggregate saving of about six months' time of field representatives of the bureau for the same reason.

The most important accomplishment, however, was the increased efficiency of the poison bait supplied by the plant as compared with bait that could be prepared by individuals working alone or collectively without the station equipment. With the bait furnished by the station it required about 25 per cent less material to do the same amount

of poisoning than with bait formerly used, which was not uniform and not always effective. This is clearly a case of greater efficiency in rodent control through cooperative action and capable management.

W. E. Crouch,
Senior Biologist, Bureau of Biological Survey.

ROSES of Everblooming Habit Available for Most Requirements Everblooming roses are available for most of the purposes for which roses are grown. Often special care is required to obtain the desired result, especially in those regions subject to conditions unfavorable to their growth. In very cold places or where strong drying winds prevail they must have special winter protection. In very dry places they must be supplied with an abundance of moisture, and they should always be protected from strong winds. Roses are natives of temperate climates, so normally their growth is checked for a period each winter. Under cultivation they thrive only with an annual checking of growth. Winter usually provides for this except in the southern parts of California and Florida. In California this result may be obtained by withholding water for six weeks or two months in summer, but in southern Florida only a few varieties that are especially adaptable to that climate can be grown.

Figure 157.—A double white Rugosa rose

Although roses are called everblooming, they usually give one large crop of flowers followed by a series of lesser crops that often become somewhat overlapping. The better varieties usually have some flowers at almost any time during the latter part of the season, but there is seldom a crop that is equal to the first flush of bloom.

Everblooming roses are in demand both for garden decoration and for cutting. A few of the cut-flower varieties may be used for garden decoration, but as a rule those not adapted to cutting are the most satisfactory. Among the latter the Rugosa rose (*Rosa rugosa*) and its hybrids are probably the best. In addition to being faithful bloomers, this species and the white and double forms (fig. 157) that pass as unnamed varieties of this species bear large scarlet hips that are showy most of the winter. The foliage is rough, healthy, and attractive. There are several hybrids, as follows: Agnes Emily Carman, double, brilliant red; Amélie Gravereaux, double, carmine purple; Blanc Double de Coubert, semidouble, white, fragrant; Hansen, double, reddish violet; Mme. Georges Bruant, loose, double, white; Magnifica, double, red; New Century, double, pink; Nova Zembla, double, pink with

white tints; Rose à Parfum de l'Hay, double, deep red, unusually fragrant; Ruskin, double, very deep red; Sarah Van Fleet, pink, vigorous; Sir Thomas Lipton, double, white, very vigorous; and Souv. de Pierre Leperdrieux, dull red.

Baby Ramblers Are Free Blooming

The Baby Ramblers bloom more freely than the Rugosas. Most of them are more dwarf in habit, and the foliage is more subject to black spot and mildew, requiring frequent spraying to keep the foliage in good condition. On the other hand, they are capable of making a wonderful mass display. Some of the varieties are Aennchen Müller, medium size, pink; Baby Dorothy, pink; Baby Elegance (fig. 158) small, single, pink; Baby Rambler (more properly Mme. Norbert Levavasseur); Baby Tausendschön (more properly Echo); Bordure, a yellowish red; Clotilde Pfitzer, white; Clotilde Soupert, ivory white with pink toward center, especially hardy; Echo, large, double, pink; Ellen Poulsen, double, pink; Erna Teschendorff, red, the foliage inclined to mildew; George Elger, copper, opening to lemon; Gruss an Aachen, very large, flesh white; Jessie, red; Katharina Zeimet, small, very double white, very free blooming; La Marne, an improved Baby Tausendschön; Leonie Lamesch, coppery red; Mme. F. Favre, single, red with white eye; Mme. Jules Gouchault, a bright rose color; Mme. Norbert Levavasseur, hardy, dwarf, vigorous, scarlet, the first of the baby ramblers; Mlle. Cécile Brunner, salmon fading to white, exquisite buds; Marie Pavie, light pink, one of the oldest and best; Meadow Sweet, semidouble, pink, sweet scented; Mrs. W. H. Cutbush, double, pink; Mignonnette, pink fading to white; Orleans, scarlet with white center, even better than Baby Rambler; Pâquerette, small, double, white; Pink Soupert, pink, foliage inclined to mildew; Rödhätte, semidouble, red, fragrant; Schneekopf, moderately double, white; Tip-Top, white, yellow, and pink; large and beautiful, but a weak grower; Triomphe Orleanais, probably the best of the red varieties; and Yvonne Rabier, greenish white, opening to sulphur.

FIGURE 158.—Baby Elegance, a baby rambler rose

China, Bengal, and Bourbon Roses

A group that more nearly approaches the cut-flower roses in appearance and gives sufficient bloom to be satisfactory for bedding includes some of the China, Bengal, and Bourbon roses and those of similar habits. Some of these are Archiduc Charles, deep carmine; Beauty of Rosemawr, carmine, beautiful form, the best bedding rose; Champion of the World, rosy pink; Gruss an Aachen, a baby rambler with characters much like these; Hermosa, lilac rose, excellent; Mme. Eugene Marlitt, large, carmine; Lucullus, deep purple-red; Pink Daily, pink, excellent, next in value to Beauty of Rosemawr; and Red Macrophylla, small, double, red, low growing.

Of those classed as cut-flower roses the following tea and hybrid teas can be classed as reasonably everblooming. Those marked with an asterisk (*) also make fairly good bedding roses. Col. R. S. Williamson, pink; Dorothy Page Roberts, pink; Florence Haswell Veitch, red;

FIGURE 159.—Mme. Caroline Testout, a hybrid tea rose

Frances Willard, white; Grace Molyneux, lemon; *Gruss an Teplitz, red; Gustav Grünerwald, pink; *Isabella Sprunt, light yellow; Kaiserin Auguste Viktoria, white; *Killarney, single pink; *Killarney Queen, pink; Königin Carola, pink; La Tosca, pink; Lady Ursula, pink; Laurent Carle, red; Mme. Abel Chatenay, pink; Mme. Butterfly, white, yellow, and pink; Mme. Camille, pink; *Mme. Caroline Testout (fig. 159), pink; Mme. Francisca Krueger, bronze; Mme. Jules Grolez, pink; Mme. Lambard, pink; Mme. Léon Pain, pink; Mme. Paul Euler, red; *Maman Cochet, pink; Marie Lambert, white; Marquise de Querhoënt, copper; Mary Countess of Ilchester, red; Miss Cynthia Forde, pink; Mrs. Aaron Ward, copper; Mrs. Arthur Robert Waddell, copper; Mrs. Herbert Stevens, white; *Mrs. Wakefield Christie-Miller, pink; Ophelia, white, yellow, and pink; Papa Gontier, red, almost single; *Radiance, pink; Red-Letter Day, red, single; *Red Radiance, red; W. E. Lippiatt, red; Wellesley, pink; *White Cochet, white; and *White Killarney, white, almost single.

Climbing Roses That Flower All Summer

There are some climbing roses that flower more or less all summer. These are chiefly climbing hybrid teas. They are relatively tender so that many of them may not be hardy north of Philadelphia, Pa., and Columbus, Ohio. Those in the following list are hybrid teas unless otherwise noted: Aglaia, also called Yellow Rambler, a vigorous multiflora with small double, tea-perfumed flowers, canary yellow as they open but becoming white (well-established plants bloom freely throughout the season); Alister Stella Gray, also called Golden Rambler, a Noisette with small, pale-yellow flowers, deeper in the center, borne in fragrant clusters throughout the season; Climbing Belle Siebrecht, pink; Climbing Gruss an Teplitz, red; Climbing Hermosa, Noisette, large pink flowers, similar to the bush variety; climbing Kaiserin Auguste Viktoria, white; Climbing Lady Ashtown, pink; Climbing La France, pink; Climbing Mme. Caroline Testout, pink; Gainsborough, white; Macartney (*Rosa bracteata*, fig. 160) often miscalled Cherokee rose, is a beautiful single white with small, dark, glossy leaves (though often trained as a climbing rose, it is usually grown as a bush); Mrs. Robert Peary, white; Reine Marie Henriette, red; and Striped Reine Marie Henriette, pink and red.

FIGURE 160.—The Macartney rose

FURMAN LLOYD MULFORD,
Associate Horticulturist, Bureau of Plant Industry.

ROSES for Trellises and Arbors Are a Result of Hybridizing The climbing roses of to-day are the results of many years of hybridizing. If one hunts through the pedigrees to discover the ancestors responsible for the climbing habit, he will discover one American species, *Rosa setigera* and two oriental species, *R. wichuraiana* and *multiflora*, as the chief progenitors, with some hybrids from the oriental *R. bracteata*, *laevigata*, *odorata gigantea*, and *banksiae*.

Many years ago the hybrids from *R. setigera*, known as Baltimore Belle, Seven Sisters, and Prairie Queen, were fairly common, but to-day American Pillar is the only *setigera* hybrid in common use, and in it the inheritance from *R. wichuraiana* obscures most of the *setigera* characteristics save the flower pattern and the tendency to late blooming.

From the Japanese *R. multiflora*, introduced into cultivation about 1822, have been secured many hybrids, but its climbing hybrids have

proved less desirable than those obtained from *R. wichuraiana*, also introduced from Japan about 1891, with the result that the former has been used in breeding chiefly with *R. chinensis* to produce the race of dwarf-everblooming roses known horticulturally as *R. polyantha.* One still finds such varieties as Crimson Rambler, Aglaia, Mrs. F. W. Flight, and Trier among the older climbing sorts and notes with interest the newer hybrids obtained by Peter Lambert by crossing and recrossing, probably with the variety Trier as a seed parent, a race in which many of the *multiflora* characteristics are still prominent. *R. wichuraiana*, because of its admirable foliage, has been more valued by hybridists and has produced a great variety of seedlings. The earliest groups may be exemplified by such old sorts as Dorothy Perkins and Jersey Beauty in which the more or less trailing habit and the small flowered and late-flowering characters of the seed parent are preserved. In other cases, such as the old Gardenia, the large-flowered characteristics of the hybrid tea parent are uppermost, and from this fact breeders have endeavored to obtain from *R. wichuraiana* a modern race of large-flowered climbing roses. These we have to-day in such plants as Breeze Hill, Mary Wallace, Emily Gray, Dr. Huey, Christine Wright, Jacotte, Dr. W. Van Fleet, and Paul's Scarlet Climber.

FIGURE 161.—A typical form of climbing *Rosa wichuraiana* hybrid

Rosa bracteata, the Macartney rose, originally from China but now established in many parts of our South, has been little used, but has in the modern variety Mermaid, with its magnificent foliage and huge pale-yellow single flowers, a worthy representative.

R. laevigata, the Cherokee rose, naturalized here in the South, but, like the last, native in the Orient, is said to figure in the pedigree of Silver Moon and is represented by a pink form, Anemone, and a red form, Ramona.

Another interesting race has been evolved from the European *R. moschata* in which there are two diverging lines of hybrids, one with large flowers as in the variety Pax, and the other with corymbs of smaller flowers as in Clytemnestra, Danäe, or Moonlight.

For the warmest parts of the country, *R. banksiae* from China, in both single and double forms and in white and in yellow, is useful

where a tall climber is needed, and the hybrids of *R. odorata gigantea*, of which Belle Portugaise is best known, furnish strong-growing climbers which may take the place of the old Noisette race, once widely grown and still beloved in such varieties as Maréchal Neil and Rêve d'Or.

For the small gardener, choice among these races should be limited to plants that are not too rampant in growth. Most of the multifloras can be dropped as inferior in quality and the choices restricted somewhat arbitrarily to the hybrids of *R. wichuraiana*, some of which almost approach climbing hybrid teas in general style and habit. Such a list might include Breeze Hill, flesh colored; Mary Wallace, rose pink; Paul's Scarlet Climber, scarlet; Dr. Huey, maroon red; Glenn

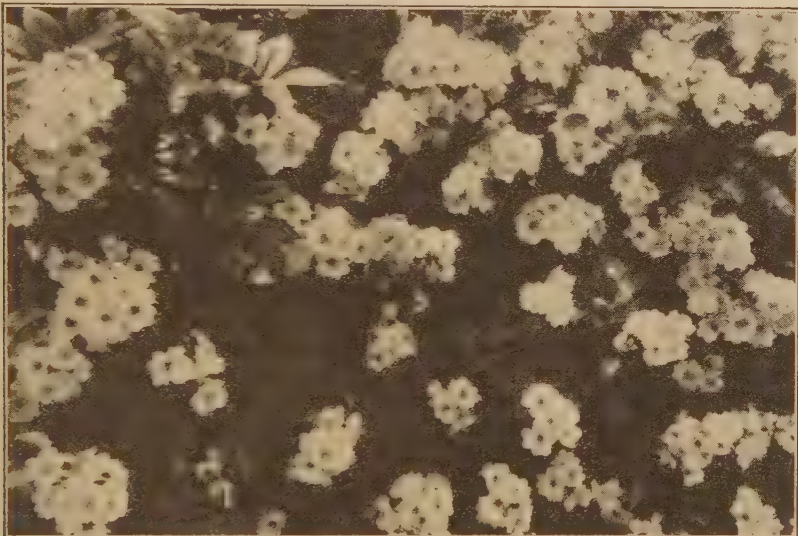

FIGURE 162.—*Rosa multiflora*, one parent of many climbing roses

Dale, lemon white; and Emily Gray, lemon yellow. To these might be added Pax, a large white musk hybrid; Climbing Lady Ashtown, a fine rose-colored climbing hybrid tea; and Zephirine Drouhin, an intense pink climbing hybrid Bengal.

B. Y. MORRISON,
Senior Horticulturist, Bureau of Plant Industry.

RURAL Community Often Too Small to Support Adequate Institutions Not many hundreds of years ago, few farmers in certain countries had farms in compact pieces of land. The farms consisted of parcels of land scattered about. It was long before each farm was consolidated into a single parcel. In Europe there are farms not yet consolidated.

This is just about the situation in the United States to-day in regard to the community in which the farmer and his family live. Theoretically, the farmer resides, for local taxation purposes, in a single compact municipality. But actually the American farmer's municipality is divided into scattered community parcels, so that, instead of being located in a single municipal area, he is a part of from three to a dozen little tax-gathering and institution-supporting communities.

The average farm family lives in a school community of not more than 100 to 200 persons. It is likely to be in a highway community not bounded by exactly the same lines as is its school community. If it is in a high-school community is that not slightly different in boundaries from the other two communities? Is not the local police and court community still different? Is there a hospital community? Does it coincide with any of the others? Is there any fire-protection community? Any library community? Any electric light and power community?

The fact is that, except in a few States, any single farm is likely to lie in several different, rather small communities and that no two such communities contain the same farms and the same group of people, and that each of these communities is too small to provide the needful community facilities for each family. There is not enough property in each to support the institution; there are not enough persons to provide an effective group, socially or economically.

The County-Seat Town

By way of contrast look at the county-seat town or the small city. Here is an incorporated community containing a population which varies, but which frequently consists of between 3,000 and 5,000 persons. This town is a single compact area established by law for community-taxing purposes. All the taxable property is taxed for the tax-supported institutions. The town as a whole constitutes a road district; the whole town is a school district, a fire district, a high-school district, a police district, a library district, a hospital district. All these districts coincide; the community possesses property enough to support the various community institutions and facilities, and people enough to use them effectively and economically. If the town were divided into 15 or 20 school districts, 10 road districts, several library districts, a few hospital districts, it is plain that the institutions would be inadequately supported, for it takes about 3,000 or 5,000 people and their taxable property to support such institutions.

Studies of the Department of Agriculture have uncovered the source of weakness in the farmer's fundamental civic organization—the makeshift character of the farmer's many small local taxing areas. The towns and cities are strong socially and economically because they have a consolidated taxing community, whereas the farmer's position is feeble because his farm is included in many inadequate taxing areas.

Studies show that the trend of organization among farmers is in one of two directions: (1) A new small community or taxing area is created to take care of a new modern institution (a drainage district, a consolidated-school district, a community-house district), or (2) the powers and duties of counties are stretched to include new community institutions for the farmers of the county—such as a county hospital, a county library, a county high school. In either case, the farmer is confronted with a confusion of weak citizenship relations, whereas the town possesses unity and strength.

Difficulty Is Remediable

That farmers have inadequate institutions (or none) for health, education, fire protection, is no longer a matter of necessity. It is a matter of outgrown and neglected civic organization of land and families.

Constant violation of the principle of volume of business in the organization of the farmer's local civic life inflicts a serious social penalty upon him and his children.

Many farmers apparently take their small, inadequate communities as an unchanging decree. But every farmer knows that a farm can be too small to operate as a modern business. Wise farmers set about getting a large enough farm. They know they must have enough horses, machinery, and stock to run the farm. Why do they accept a municipality of many scattered too-small communities?

The science of human groupings for growing needs demands a legalized change from the too-small to the large-enough community. The question is, How make the change? The time may come when the discussion in farming circles of whether "our community" is large enough to carry modern institutions will be as common as the discussion of the price of wheat.

The logic of this whole confused, inadequate-community situation drives one to look for such a reorganization of the farmer's civic community relationships as shall give him a single consolidated taxing community area large enough to support all the modern institutions and facilities he requires. The farmer needs a new rural municipality which in its civic power is on a parity with that of town or small city.

C. J. Galpin,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

SCREW-WORM Losses to Livestock Industry Can Be Reduced Losses from the screw worm have been estimated at from $4,000,000 to $10,000,000 annually. These losses are confined largely to the great livestock-producing areas of the Southwest. Some of them occur in Louisiana and Arkansas on the east and as far as Kansas on the north, but Texas, New Mexico, Arizona, and California suffer most.

While farmers and dairymen may be troubled by the screw worm, the close attention which they are able to give to their livestock largely prevents severe cases and death loss. It is on the range, where the animals can not be so closely watched, that the losses are severe. In the southwestern part of this region, especially where the brush is dense, the losses among calves have been so heavy as to cause cattlemen to discontinue the keeping of breeding animals, and to stock their ranges with steers. As a result of certain changes in ranch practice, however, many ranchmen have more recently returned to the breeding business.

The screw worm attacks all kinds of livestock and even man. Its ravages are probably most severe among sheep and goats, but it is a very serious pest of cattle, horses, and hogs. The losses caused by the insect are brought about in several ways. The death loss is often considerable, especially in sheep and calves. The former show a marked tendency, when infested, to hide in dense thickets, in which they are often eaten alive by the worms. It is now generally recognized by stockmen that many of the sheep and goats which disappear (their loss frequently being charged to theft or escape as their carcasses are not found at the time) are really killed by screw worms. All heavily infested animals show marked reduction in condition, which requires weeks to overcome after the wounds have healed. The wool

and mohair clip is reduced, in some cases the coat being so badly shed as to make shearing not worth while. A number of additional men are required to check up on the stock and round up and treat the screw-worm cases. The number varies according to the severity of the outbreak and often amounts to a 50 per cent increase in the number required to handle the stock in the absence of this pest.

Expense Not Small for Screw-Worm Medicine

The item of screw-worm "medicine" is by no means small. It often runs into hundreds of dollars on a large ranch, and the total for the country probably exceeds $1,000,000 annually. There are a number of indirect effects in addition, such as limitations on the season of breeding, which may result in some cases in less favorable marketing or increased cost of handling; loss from frequent agitation of herds and flocks; early spring or late fall shearing, which adds to weather hazards and at times brings about heavy loss, especially among goats; and avoidance of branding during periods of screw-worm abundance, which may result in the loss of animals through straying or theft.

There is much variation in the damage produced by screw worms from year to year and in different localities. Warm, showery weather is favorable to screw-worm attack, and when such weather prevails for some time an outbreak is almost certain to occur. This condition is brought about by a greater longevity of the flies, by an apparently increased attractiveness of wounds on account of their moist condition and odor, and especially by more favorable breeding conditions for the screw worms in carcasses, which promptly give rise to hordes of flies intent on laying their eggs in any attractive place available. The facts that the screw-worm flies will breed in any dead animal available and that they are strong fliers preclude the possibility of eradication, but emphasize the importance of community action and of improving range sanitation.

Indirect Benefit From Tick Eradication

The eradication of the cattle tick from a large part of Texas has had a distinct effect in reducing losses from screw worms. The more extensive use of good fences facilitates the handling of cattle and gives an opportunity to find screw-worm cases more promptly. Limiting the breeding season, and consequently controlling the time of birth of young, is a very essential step in cutting losses from this pest. This practice is tied up closely with the production of supplemental feeds on ranches or the feeding of cottonseed cake. Both of these practices have been found advantageous in keeping breeding animals strong and producing better calves, aside from their bearing on the screw-worm problem. The timing of castrating, marking, branding, and shearing to avoid the periods when flies are abundant has also been shown to lessen greatly the trouble from screw worms. Recently, attention has been attracted to the use of a pincer type of emasculator which avoids all bleeding in castration, and thus eliminates this avenue of screw-worm infestation. A study of the factors favoring screw-worm attack indicates that boils, especially in goats, induce a large percentage of the screw-worm infestations in the summer. It has also been noted that boils appear most frequently in animals of low vitality and that screw-worm cases are much more difficult to heal promptly in such animals. This emphasizes the need

of breeding from vigorous stock and eliminating unthrifty animals. The presence of horns, especially among cattle, results in many wounds and consequent screw-worm infestations, and this indicates the advantage to be gained in screw-worm control from systematic dehorning of calves or the breeding of mulley strains.

FIGURE 163.—Carcass ready for burning. A small trench has been filled with wood, and the carcass turned over onto the wood

Burning of Carcasses Reduces Losses

Carcass disposal, preferably by burning, although an indirect method of meeting the screw-worm situation, is probably the most important single step in this direction. (Fig. 163.) Community or even state-wide effort toward prompt and complete carcassdestruction would, it is believed, materially reduce screw-worm losses. The type of pastures where the sick and worm-infested animals are kept while under treatment has been found to have an important bearing on the rapidity with which wounds are healed. Such pastures should be located on high ground free from underbrush, shade being provided by a few large trees, thus eliminating the conditions most favorable for the flies and reducing the likelihood of reinfestation of wounds.

FIGURE 164.—Fly trap, with 10 days' catch of screw-worm flies

The construction of fly-proof houses for wounded animals is steadily gaining in favor. These screen structures enable the ranchmen to protect their more valuable animals against infestations following operations or accidents. When screw-worm infested animals are placed in such houses after the worms are killed their wounds have been found to heal very promptly.

Fly-trapping is considered by many progressive ranchmen as a necessary routine ranch practice. (Fig. 164.) The use of fly traps in

hospital pastures has been shown to lessen materially the number of treatments required to heal the wounds of screw-worm infested animals. The operation of traps throughout considerable districts in the range country is also thought by many to have distinct merit, but a thorough investigation of the many factors involved is necessary, both to make the trapping most effective and to determine the true value of this plan. In several districts fly trapping is proceeding on an organized basis through the cooperation of a number of ranch owners. (Fig. 165.) In one county in Texas approximately 2,500 traps are in operation. The quantity of screw-worm flies caught per trap during a season averages about 3 gallons, or approximately 100,000 flies. Since each female may lay 1,200 eggs, the destruction of so many flies would certainly indicate that some good is accomplished by trapping.

FIGURE 165.—Five hundred and seven gallons of screw-worm flies trapped in six weeks in one locality

F. C. BISHOPP,
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SEED Testing to Show Value for Planting Is Increasingly Necessary

The testing of seeds intended for planting was started in Europe about 75 years ago and in the United States a few years later. In its early stages, seed testing mainly served the farmer directly with information about the presence of weed seeds and the power of the seeds to develop into plants. The resulting increase of knowledge about seeds led to a definite demand for better and cleaner seeds and for control of the labeling of seeds sold to farmers for planting. To meet this new condition, seed analysts tended to develop seed testing in a manner that gave more attention to relative values for trading purposes than to actual planting values. With the demand for clean seeds, trade competition overstressed high purity value, making elaborate purity tests necessary for seed-control work. The difficulties encountered in testing some seeds for germination have challenged seed analysts to obtain highest possible germination values in an attempt to show their ability to make the seeds grow. This series of developments in seed testing gradually led to arbitrary laboratory methods that did not necessarily serve the original purpose of telling the farmer the value of his seed for planting.

Under present agricultural conditions, accurate knowledge of seeds to be planted is even more necessary than ever before, and seed testing

is attempting to meet the need by getting back to a germination test that will show the possible value of the seed for planting. This is not so simple as it may seem at first. When a sample of seed, especially one of questionable value, is germinated under artificial conditions in the laboratory, there will be found a series of seedlings of decreasing vigor and some seeds that have not germinated.

Soil Testing Distinguishes Good from Bad Seed

For a practical report, the analyst must divide the seeds into two classes, good and bad; but there is no definite natural division in a lot of seedlings produced under artificial conditions. It is evident that many seedlings have only enough energy to break their seed coats, while others, because of injury in harvesting, are not complete seedlings; yet it is difficult to know where to draw the line between useful

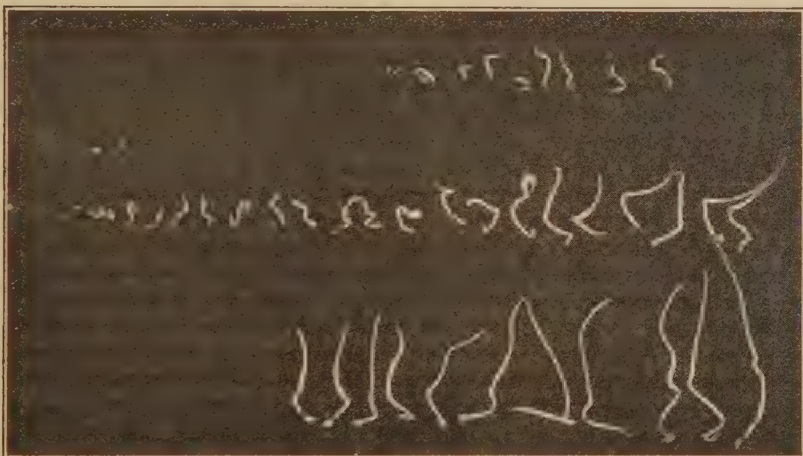

FIGURE 166.—Fifty seeds of a sample of poor quality red-clover seed were germinated between blotting paper. After six days the seedlings were arranged roughly in the order of their value. This series shows the difficulty of determining by such a test alone which seedlings are of possible value

and useless seedlings. Moreover, growing seeds between blotters or other artificial materials does not furnish natural conditions for the seedlings to become established. Why not, then, make use of natural conditions and put the seeds in soil and let the seeds themselves show whether they can develop into plants? With the present demands on seed-testing laboratories, it is not possible to go back to making all germination tests in soil, but it is possible to become familiar with the behavior of seeds planted in the soil, and in this way be able to make a laboratory test that will correspond to one made in soil and give as nearly as can be done the value of the seed for planting. The seed laboratory of the Bureau of Plant Industry is now making germination tests on this basis so that the results will be of as much value as possible to the farmer.

It is now realized that the actual germination of a sample of seed may not be of much value if the sample carries infection of some plant disease. American seed laboratories are beginning to cooperate with

plant-disease experts to give information about the presence of disease where this is possible.

The Federal and State seed laboratories are anxious to be of service to agriculture. The farmer should learn what type of seed will fit his conditions, and then the seed-testing laboratory can help him find the seed he needs.

E. H. Toole,
Associate Physiologist, Bureau of Plant Industry.

SHEETS Wear Chiefly at Shoulder Height, Durability Tests Show Until more is known about the relative value of fabrics made from different kinds and qualities of fiber, it will be impossible to direct American-grown textiles into the most useful and profitable types of materials.

Such information is also necessary if the consumer is to be assisted in making wise selections from the fabrics on the retail counter. The great variety of materials now available makes it almost impossible for the average purchaser to judge even very obvious values accurately. In an effort to improve the situation, many women are asking that fabrics be labeled with some kind of specifications, either in regard to their construction or the performance which may be expected from them. Already a few technical groups have met to discuss the possibility of doing this and have tried to determine the kinds of quality specifications that would be most useful to home makers. In all of these, the quality of the fibers which compose the yarns in the materials must be taken into consideration, but just how much and in what ways this affects the usefulness of the finished fabric for some particular purpose is not completely known and has increased the complexity of the problem.

Sheeting is a good example of a fabric of simple construction in which the quality of the cotton fiber should be a very important matter, and yet practically nothing is known of the relation of the length, strength, and similar properties of the fiber to the durability of the finished sheet. If these facts were available it would be possible to have the sheets labeled with information of this kind and thus give the consumer a way of deciding which particular sheet would best serve her purpose.

Hotel's Discarded Sheets Examined

A study of just these points has been undertaken by the Bureau of Home Economics in cooperation with the Bureau of Agricultural Economics. Sheets are being woven from different kinds of cotton selected and graded by specialists in this work. When these are ready, actual wearing as well as laboratory tests will be made on them. As a preliminary step in the study, the Bureau of Home Economics recently examined the wear shown by 400 sheets discarded by one of the Washington hotels. These were all of one brand and were purchased in October, 1921. Since the hotel maintains a fairly uniform laundering procedure it was possible to obtain at least an approximate picture of the reaction of this one type of sheet to institutional service.

The bureau was particularly interested in the kinds of wear shown by these sheets. However, another question had been raised in connection with sheeting durability which seemed to need study. Recently there has been some demand among institutional buyers for sheets with equal hems top and bottom. The argument usually advanced is that bedding wears out where the feet rub and equal hems would decrease the possibility of this friction always coming on the same portion of the sheet. With this contention in mind, the areas of maximum wear on the hotel sheets were also noted.

These were determined by placing a sheet on one of the beds on which it was used and estimating the position of a person lying upon it. A diagram was then made on which the folds of the sheet and the areas occupied by various parts of the body were indicated. (Fig. 167.) As all the sheets and beds were the same size, the areas of wear could be judged by referring to this diagram. Such a chart was made for each sheet, and by the use of a system of abbreviations, the condition of each was recorded.

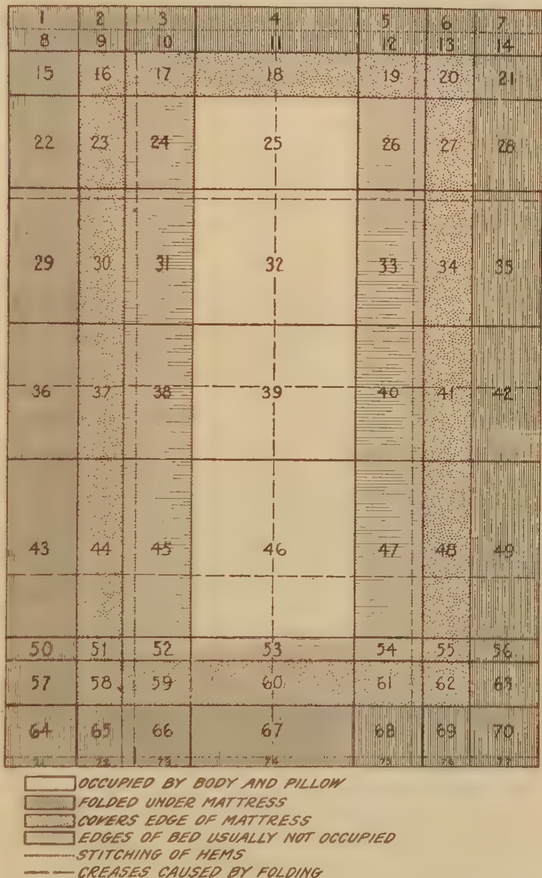

FIGURE 167.—Chart used for recording data from each bed sheet. Area 25 is ordinarily occupied by the pillow, area 32 by the shoulders and back, area 39 by the hips, and area 46 by the feet and legs

The types of wear were classified as holes (chiefly of the "pepper pot" type), splits, triangular tears, and threadbare places in which either the warp or the filling yarns had given away. Some selvages were worn as well as the edges of the turned hems and the line upon which they were stitched.

Maximum Wear at Shoulder Height

From the records obtained, it was very evident that the area of maximum wear on these sheets was in the majority of cases at the shoulder height. (Fig. 168.) Some showed two different places of greatest wear, but even when these were included, there were 304

instances of maximum wear at the shoulder height and only 17 of greatest wear in the area which the feet and legs occupy. In fact the latter figure was the smallest obtained. In 59 cases, the center of the sheet showed the greatest wear.

One reason advanced for these results was that the guests at the hotel at which these sheets were used are chiefly women. It might be that the low-necked night clothing commonly worn permitted the body perspiration to reach that part of the sheet and cause more rapid deterioration. In order to check this point, worn sheets were obtained from the Washington branch of the Young Men's Christian Association and examined in the same way. In these, the types and areas of wear were the same as those shown by the sheets used in the hotel for women. However, since only 60 of these were available, the results may not be representative.

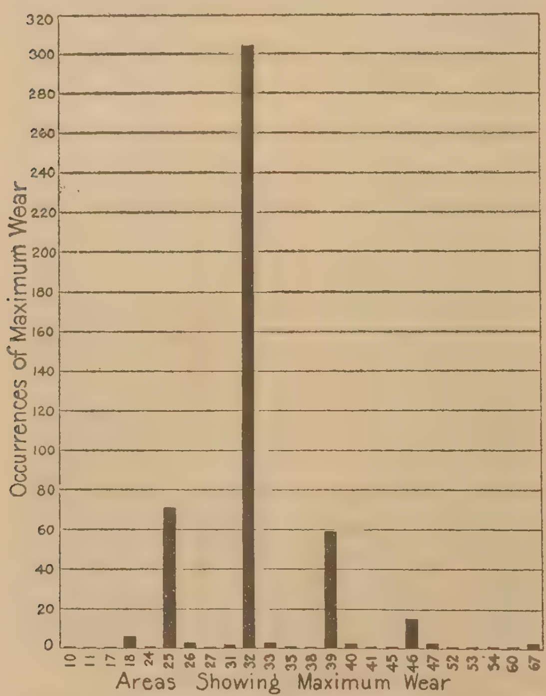

FIGURE 168. —Diagram showing number of times maximum wear of 400 bed sheets occurred in areas designated in Figure 167

Most of the wear on the hotel sheets was due apparently to weak filling yarns. Breakage of these was responsible for 385 of the threadbare places, while breakage of the warp was noted in only 117 such instances. This weakness of filling yarns also became apparent in the record of breaks on the folds. The vertical folds showed 26, 208, and 28 breaks on the left, center, and right folds, respectively, while the upper, center, and lower horizontal folds were broken in 8, 13, and 6 instances, respectively.

The large number of breaks on the center lengthwise fold was interesting. This weakness in sheets has been noticed by many observers and has usually been attributed to the fact that the sheets are often folded there before being run through the ironer. However, these sheets had always been ironed without being folded. The folding was done by hand afterwards. This raises the question as to whether the line through the center is injured in the manufacturing process or is subjected to excessive wear while the sheets are stored.

Torn Selvages Numerous

The large number of torn selvages clearly pointed to the need for greater attention on the part of home makers and institutional man-

agers to the condition of the springs and bedding against which sheets rub. Among the 400 sheets, there were 689 cases of worn selvages.

However, the most startling figure obtained related to the types of wear. There were 5,232 splits reported, most of which were warpwise. That is, it was the filling yarns that had given way. Small holes, also, were numerous, but there were only 120 cases where the holes were caused by yarn knots (usually considered an important matter in fabric durability).

These results have been brought to the attention of sheeting manufacturers, and it is hoped that some firm will strengthen those parts of the sheet that first show wear. It is certainly possible to construct a sheet with stronger selvages and reinforcements at those places which receive the maximum amount of wear.

RUTH O'BRIEN,
Senior Textile Chemist, Bureau of Home Economics.

SNAG Felling by Dynamite Cheaper Than by Sawing Standing dead trees, or snags, are a constant source of concern to any agency operating in the Douglas fir region of Oregon and Washington, which is the area west of the Cascade Range. Snags are present in virgin timber stands, on cut-over lands, and particularly in old burned-over areas. In the burned-over areas as many as 30 per acre can be found. Getting rid of them involves an expenditure from which there is no return in merchantable material. They must be felled, however, not only on construction work, but for protection purposes. Quick control of a forest fire often depends upon rapidity in snag felling.

FIGURE 169.—Boring snags with the electric drill

The usual way to fell snags has been by sawing them off, but the cost in this region for a snag with an average diameter of 35 inches is \$1.17. This high cost is a time or labor charge, and any method to be appreciably cheaper must be faster.

Since no merchantable material is involved in snag felling, the problem becomes one of demolition, and this suggests the use of explosives. Tests on the Columbia National Forest made it apparent that the most effective use of explosives is in holes bored into the snags. Hand boring, however, is even more expensive than sawing; hence the development of power-boring machines.

The first machine used was a semiportable electric-light plant which drove an electric drill carrying a 1⅛-inch ship auger of sufficient

length to reach the center of any of the snags to be removed. This assembly, although satisfactory from an operation standpoint, was too heavy for pack-horse transportation; so a light 2-cycle, air-cooled, gasoline motor was adopted for driving an auger through the medium of a flexible shaft and a gear-reduction head. This assembly may be dismounted into three units, each of which can be easily carried by one man.

Technic of the Operation

The technic of the operation is to drill 1⅛-inch holes from two sides of the snag on an angle as nearly 45° as possible. For example, the holes on the south should slope upwards and those on the north downward. All holes are detonated at the same time, and the snag is thrown to the north. The action of the explosive is to kick the butt outwards, using the stump as fulcrum. The direction of throw is not absolute although in experiments on 60 snags, 43 per cent fell within 50° of the aim. Increasing the amount of explosive increases the control of direction.

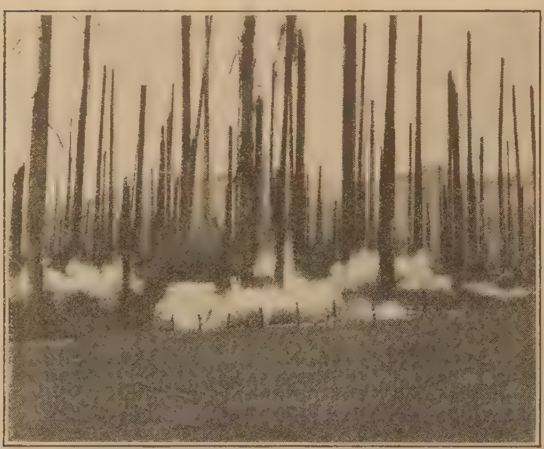

FIGURE 170.—Blasting down snags in bunches

Experimentation showed 40 per cent dynamite to be the best explosive, safety in handling, cutting action, and the fact that less difficulty was experienced with "powder sickness" being taken into consideration.

The amount of powder to use for a snag of given diameter was determined through trial and error and the following formula evolved. Take the area of the cross section of the snag at breast-height in square inches and divide by 110. The result will be the number of sticks of 40 per cent dynamite required. One hole should be bored for each four sticks to be used. The 40 per cent dynamite makes a horizontal cut of from 12 to 14 inches in width.

Saving Increases With Size of Snag

The experimental work shows an advantage in cost in favor of boring and blasting as against sawing which increases appreciably with the size of the snag and the amount of pitch encountered. The data obtained under the particular conditions of the experimental work show that the cost per 1,000 snags for sawing is $1,074.27, while the cost of boring and blasting is $861.98, a saving of about 20 per cent. These figures are, of course, averages and may not be applicable to specific areas where there is a wide difference in the distribution and size of the snags. Where there is a large number of small-diameter snags the costs would probably be more nearly the same for both

FIGURE 171.—Where the experiments in boring and blasting snags were conducted

methods; yet if there is a preponderance of large-diameter or pitchy snags, the balance would be considerably in favor of the boring and blasting method.

F. V. HORTON,
Supervisor, Columbia National Forest, Forest Service.

SOIL Activities Affected in Complex Manner by Plowing in Green Manure

The problem of increasing or even maintaining the nitrogen content of the soil is increasingly important as our soil nitrogen becomes more and more depleted. It is generally conceded that, as a result of our extensive system of farming, the nitrogen content of most of the arable soils is lower than formerly. If profitable crops are to be grown, nitrogen must be supplied to them as economically as possible. Owing to the motorization of transportation, it is no longer possible to purchase quantities of animal manures from city stables. Farmers, therefore, must turn to other sources of nitrogen.

Commercial forms of nitrogen, on account of their easy application and quick action, are being used, but for many purposes are still too expensive. Green manuring, that is, the plowing under of an immature crop grown expressly for this purpose, has been practiced since ancient times. If the crop grown is a legume or a mixture containing a legume, the nitrogen of the soil is increased. Bacteria in the nodules occurring on the roots of legumes are able to supply the plant with nitrogen by using the free nitrogen from the air, thereby not only saving the nitrogen already in the soil for the next crop, but adding

more to it when the green manure is plowed under. This method of soil enrichment has appealed to many farmers and during the last decade has been used to an ever-increasing extent.

This great increase in the use of green manures has stimulated much experimental work upon the green-manure crops best suited to particular soils and climates. Obviously it is important to obtain a good growth of the green-manuring crop; poor crops have little value when plowed under.

Factors Are Numerous and Complex

The effect of green manuring upon the quantity and quality of the succeeding crops is usually the farmer's measure of the efficiency of the practice. But a failure to produce an increase in crop yield should not be attributed to the green manure as such. Many factors are involved in the decomposition of a heavy application of green material. Some are well known, others obscure. Research work on the effects of green manuring upon the biological processes taking place in the soil has been stimulated in proportion as green manuring has been practiced. For the past two years studies along this line have been carried on in the division of soil microbiology. Special attention has been paid to the effect upon the soil microflora, the accumulation of nitrates, the evolution of carbon dioxide, and changes in soil acidity.

The decomposition of green manure is greatly influenced by the temperature and moisture of the soil. Most soil bacteria require a temperature of 65° to 70° F., or often higher, for rapid activity. Temperatures below this, such as occur in the early spring, retard their growth. Lack of proper moisture has the same effect. The rate of decomposition is therefore dependent on both of these conditions. Experiments have shown that under the best conditions succulent green manure was nearly all decomposed in 7 days. But at lower temperatures the rate was slower, and more than 14 days were required. If tests are made under variable field conditions, the physical factors affecting the decomposition must be carefully noted. The experiments should be carried on under a wide range of temperature and moisture conditions and conclusions based on those conditions alone. Much of the former work on the changes occurring in the soil after green manuring has been based upon experiments carried out in laboratory flasks with handfuls of soil. Some investigators have used jars in greenhouses for holding the soil. An elaboration of the latter method is the use of greenhouse benches of sufficient area and depth to approximate field conditions. The advantage of working in the greenhouse is that moisture and temperature, which are uncontrollable in the field, can be kept at the optimum.

Effects of Plowing-In Green Material

Plowing under a large amount of green material has a profound effect upon the microscopic life in the soil. The number of bacteria close to and in the material increases enormously. Under favorable conditions the numbers may increase ten times within two days; in four days there may be fifteen to twenty-five times the original number. This increase has been found to take place in the decomposing material and adjacent soil. No increase took place one-half inch away from the decomposing material. After seven days there is a decrease in the number of bac-

teria which is as rapid as was the increase. This means the end of the easily decomposable material. The numbers, however, often remain higher than in the untreated soils. This may be due in part to the slow decomposition of the more resistant compounds, such as lignin, in the green manure.

Fungi have often been considered as important agents in this decomposition. Their activity seems to be confined to the surface layer of the soil and to material less succulent than green manure. They and the actinomyces, which are closely related to them, do not seem to be able to compete with bacteria in the decomposition of fresh, green material turned completely under by the plow.

Protozoa and nematodes have been found to increase in the decomposing material. Their numbers always remain low in comparison with the smaller bacteria. But the fact that they increase seems to indicate that they have some function; whether this be to help in the decomposition of the green manure remains to be seen.

Composition of Green Manure

Green manure consists mostly of carbonaceous and nitrogenous material. The decomposition of this gives rise to carbon dioxide and ammonia, respectively. The former escapes from the soil into the air; the latter is absorbed by the soil and, through the action of bacteria, is oxidized to nitrite and then to nitrate. It is obvious that the greater the percentage of nitrogen in the green manure, the more nitrate will be formed from its decomposition. This explains in part why legumes are so beneficial as green manures.

On the other hand, if the nitrogen be low, as in mature rye, it may all be absorbed by the bacteria in the process of decomposition. It will be released slowly when the bacteria die. No benefit, or only a slight benefit, to the succeeding crop might be seen in this case. Harmful effects may even result if the nitrogen is as low as it is in straw. The bacteria and fungi decomposing the straw, in this instance, obtain their nitrogen from the soil and may successfully compete with the crop plants for the available nitrogen. As a result succeeding crops suffer for want of nitrogen.

The rate at which the organic nitrogen in green manure is changed into nitrate depends, first, upon the rapidity with which the material is broken down and ammonia formed. In the early stages of decomposition the ammonia and even the nitrate in the soil is used by the bacteria in their growth. In the case of leguminous green manures which have a high percentage of nitrogen, an excess of ammonia over the needs of the bacteria soon develops. By the time the decomposition is nearly complete and the numbers of bacteria decrease, the largest amount of ammonia is found. The process of nitrification being fairly slow, no great increase in nitrate may be found until two or three weeks after the treatment. Under conditions of lower temperature, the process of decomposition is slowed down, with the result that nitrates do not accumulate until about the fourth or fifth week. This, of course, will vary greatly under different conditions. However, it is easily seen that this has a practical bearing upon the relationship of the plowing under of the green manure to the seeding of the succeeding crop. Recommendations in this respect should be made only after careful experimentation in the particular locality.

Economic Loss Through Decomposition

As stated above, the carbonaceous material in the green manure is decomposed to carbon dioxide and lost in the atmosphere. This actually represents a great economic loss. It is true that the nitrifying bacteria need carbon dioxide in order to function and that carbon dioxide may render the soil minerals more soluble, but these processes, working over long periods of time, require only small amounts of carbon dioxide. Large amounts of carbon dioxide are evolved from the soil during the period of greatest activity of the bacteria. In fact, the curves representing the amounts of carbon dioxide evolved and the numbers of bacteria are remarkably similar. Under these conditions carbon dioxide evolution might be used as a measure of the bacteria activities.

The idea that green manuring produces acidity in the soil appears to be rather widespread. Some investigators have reported that the acidity of the soil was increased, whereas others have reported the opposite. This difference in results is probably due to the varying conditions of the experiments. The ammonia liberated in the decomposition of the leguminous green manure changes the reaction of the mass and of the adhering soil toward the neutral point if the soil is acid and tends to make the soil more alkaline if it is neutral. This local effect of the ammonia perhaps explains how it is possible that nitrification takes place in soils which have been found too acid for the nitrifying bacteria. If all, or most, of the ammonia were quickly changed to nitrate, the condition of that area should be more acid than at the start. This requires a comparatively long time, and other factors may enter to change the final results. However, there is no doubt that the difference of opinion as to the effect on soil acidity is due to the local character of the decomposition and to the fact that the reaction is changed during the process.

Other Effects of Green Manure

The effect of green manure upon the physical character of the soil, the moisture-holding capacity, or the prevention of erosion and the leaching of the soil by the use of winter cover crops are outside the scope of this article. But in passing over this phase of the subject it should not be overlooked that these factors may have an important bearing upon microbiological processes in the soil. The mere growing of legumes has a stimulating effect upon the bacteria of the soil, and succeeding crops may be benefited even though the tops of the legumes are removed.

NATHAN R. SMITH,
Senior Bacteriologist, Bureau of Chemistry and Soils.

SOIL Color Is Clue to Presence or Lack of Desirable Qualities The color of a soil is, in itself, of minor importance. Black and red soils, and dark soils in general, absorb a greater proportion of heat from the sun's rays than white and light-colored soils. This fact makes the dark soils earlier than the light-colored soils, other things being equal. As an indicator of the composition, however, and general condition of the soil, the color is at once a valuable and distinguishing characteristic.

The different colors in soils are caused by differences in composition, but it is not always the soil that has the greater quantity of the colorful constituent that has the deeper color. It is the form or combinations in which the colored constituents occur that give color to the soil.

A black soil is usually a rich soil and, in general, the darker the soil the more productive it is. Black color in soils is due to organic matter in combination with lime. The actual quantity of organic matter need not be large. Black soils frequently contain less than 2 per cent of organic matter. But if the organic matter is saturated with lime and other bases, it makes a most favorable condition for plant growth.

Organic matter also colors soils brown. Such soils are generally acid, and the organic matter, while it may be abundant, is not saturated with lime. A reddish-brown color ordinarily indicates the presence of organic matter and iron oxide. Examples of such soils are the prized "mahogany lands" of the South.

Red and yellow soils owe their color to the iron oxide they contain in the free state. Experience has shown that the coloring matter is in the clay or finest matter in the soil. This clay is largely made up of silica, alumina, iron oxide, water, and organic matter. The color does not depend primarily upon the total quantity of iron present, as the percentage of this constituent varies little in the clay of surface soils whatever color they may be.

Clay is formed by the weathering of silicate rocks. When first formed, it is colorless, or nearly so, and contains a large proportion of silica, this heritage being a reflection of the composition of the parent rock. After the clay has been formed, weathering processes diminish the silica and increase the alumina and iron oxide.

Compounds in Clay

The compounds present in the clay are fixed by the relative quantities of silica on the one side to alumina and iron on the other. The soil clay appears to be made up of a stable compound of silica, alumina, and water. In this compound there are two or more molecules of silica to one of alumina. Iron can and does replace a part of the aluminum in this compound, and when in such a combination, the iron does not give any red or yellow color to the soil.

When the clay weathers and loses so much silicia that there are less than 2 molecules of silica to 1 of alumina and iron, a part of the iron is set free and appears as a reddish yellow, hydrated, ferric oxide. With further weathering the proportion of free ferric oxide is increased and the clay becomes deeper red or reddish brown in color. In the brilliant red and reddish-brown soils of the Southern States the iron is practically all in the form of free ferric oxide. If the proportion of free ferric oxide in the soil is small, the soil is yellow; if it is large the soil is red or even brownish red.

These red or reddish-brown soils are rated high agriculturally. The reason for this is not so much on account of the ferric oxide they contain as because of the soil condition indicated by the presence of the ferric oxide. The red color shows at once that there is an adequate quantity of colloidal matter to supply and conserve plant food and that drainage and other general soil conditions are favorable for plant growth.

White or light-colored soils are in poor repute and justly so, for such color shows a lack of important constituents. Very light-colored soils

are generally sandy and contain neither the clay nor the organic matter necessary to absorb and retain plant food and water. Light-colored spots in colored areas indicate that such soils have been subjected to the slow leaching that takes place in water-logged soil where the organic matter has disappeared, and the lime, phosphoric acid, iron oxide, and manganese have been dissolved away from the surface soil.

Other Colored Constituents

The soil contains other colored constituents in addition to organic matter and iron oxide. Streaks of "black sand," or magnetite, are occasionally seen along roadsides and in gullies. Other colored minerals are sometimes apparent, but these are of very minor importance. In the Southern States there are a few examples of soils of a peculiar chocolate-brown color. These soils are colored reddish brown by iron oxide, primarily, but the peculiar shade seems to be due to an admixture of manganese dioxide.

Thus it is seen that soil color upon which pioneers have based their opinion of the value of the soil, is a distinguishing characteristic of soils. The color not only diagnoses the presence or absence of desirable constituents, but is a clue to the composition and consequently the properties of the clay, the active ingredient of the soil.

W. O. Robinson,
Chemist, Bureau of Chemistry and Soils.

SOIL'S Acidity Can Be Accurately Expressed by the pH Value

The use of the words "sour" to express a condition of acidity, and "sweet" to express the absence of acidity, is quite generally accepted, with regard to soils. However, if one were to say that a soil had a pH value of 5.0 and another soil had a pH value of 7.4 one would be stating practically the same thing, namely, that the former is sour and the latter is sweet, but using a technical term which is rapidly becoming popularized and is a definite expression of the intensity of acidity. In brief, therefore, the pH value is a number which expresses the intensity of acidity and is capable of being accurately determined. It is well to bear in mind, however, that the pH value is not a measure of the quantity of acid or acid substances present, but indicates the intensity of acidity only. The significance of the pH value may be further simplified by reference to water.

From a chemical point of view water may be considered as yielding to a very small degree two simpler component parts, one part (the hydrogen ion), characteristic of acids, and the other part (the hydroxyl ion), which is characteristic of alkalinity. In pure water the concentrations of these two parts are equal, and the resulting condition is one of neutrality; that is, the water is neither acid nor alkaline. At the neutral point where neither acid nor alkaline properties are exhibited, the pH value is known to be 7.0, and values below 7.0 indicate increasing acidity and values above 7.0 indicate increasing alkalinity. There always exists in any aqueous solution what might be called a condition of balance or equilibrium between the part characteristic of acids and the part associated with alkalinity. That

is, when the concentration of the acid part (hydrogen ion) increases, the alkaline part (hydroxyl ion) decreases and vice versa, but neither part ever becomes zero. Since there are always present in any aqueous solution both the acid and the alkaline parts, one may refer to any aqueous solution, whether acid or alkaline, in terms of the amount, or better, the concentration of the acid part.

The resulting condition or reaction, then, obviously depends entirely upon which part is in excess. When a determination of the acidity is made it is the concentration of the acid part or hydrogen ion which is determined, and this is expressed for convenience in a form called the pH value. In this mathematical change over to the pH value it so happens that low pH values, that is, values below pH 7.0, represent increasing acidity, so that the acidity at a pH value of 4.0 is greater than that at pH 5.0, pH 5.0 is greater than pH 6.0, and at pH 7.0 the neutral point is reached. As the pH value increases above 7.0 the soil or solution becomes more alkaline, that is, the alkalinity at pH 8.0 is greater than at pH 7.0, that at pH 9.0 is greater than at pH 8.0, etc.

Two General Methods Widely Used

For the determination of the pH value two general methods have been widely used, the electrometric, and the colorimetric methods. The electrometric method, as the name implies, employs complicated electrical apparatus, whereas the colorimetric method, the simpler of the two, and sufficiently accurate for many practical purposes, makes use of substances known as indicators, the colors of which vary with the acidity or alkalinity of the substance being tested. Comparison is then made against color standards of known pH values, which have been standardized by the electrometric method. Because of its ease of manipulation, as well as the simple apparatus required, the indicator method, of which there are many adaptations, has found wide application not only in the laboratory but in the field and among florists, nurserymen, etc., or where a laboratory is not available.

The determination of pH values has found extensive application in the industries and in research and particularly in the field of agricultural investigations. To the investigator in almost any field an accurate knowledge of the intensity of acidity alone or linked with other factors is of considerable importance. In those instances where it is necessary to correct soil acidity by the application of lime (increasing the pH), or to increase the acidity by the use of ammonium sulphate or sulphur (decreasing the pH), the effect can be accurately followed by determining the pH value. A knowledge of soil reaction or the pH value has also proved of exceptional value to those sections where potato growers have sustained losses due to scabbing of potatoes. It has been found that an acidity represented by a pH value of about 5.2 will inhibit the potato-scab organism from functioning, and consequently in those sections where scab is present the disease has been controlled by keeping the soil fairly acid, namely, at about pH 5.2. With the legumes a neutral or slightly alkaline reaction has been found desirable, this also being the case for sugar beets. Similar data have been and are being accumulated for a large variety of crops, and while some tolerate a fairly wide range as regards the pH value, others show a more or less definite preference for an acid, neutral, or alkaline soil.

Since in many instances yields as well as quality are definitely associated with the soil reaction it is obvious that an accurate knowledge of the pH value is important.

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SOILS Under Various Conditions Hoard, Bank, or Waste Plant Food

Nature hoards some of her assets in an almost miserly manner. Even plant food may be kept in such closed vaults as to be only a long-time investment, bearing a very low rate of interest. Some of the coarser soil mineral grains such as feldspars, micas, and the like may contain large potential supplies of potassium and other fertilizing elements, while the soil containing them may be of low fertility because of their lack of availability. There appears to be little in the way of farm practice which can be done to release these hoarded stores.

A second class or condition of plant food is that which serves as a savings bank, whose deposits are subject to the "draft" of a crop whether for the present or the future. The colloidal material appears to offer such banking facilities to the soil. The colloidal material consists primarily of very fine decomposed rock fragments, together with organic matter. It makes up by far the greater portion of what is frequently known as the clay content of soils. The colloidal material differs from the coarser mineral grains in other ways than in particle size. In addition to having a marked influence on the physical behavior of soil, its ability to serve as a plant-food depository is most marked. The presence of colloidal material in itself does not insure a rich plant food deposit. Its character varies widely, being a resultant of parent-rock material, climate, and vegetation. This colloidal material, although sometimes badly impoverished by nature is, in the main, the soil's most valuable asset. Furthermore, it is the plant-food asset over which the farmer has the greatest control. Little can be done to significantly alter the quantity of colloid in a soil, but much can be done to maintain or improve its quality.

Colloidal Material May Store Plant Food

A bank deposit can not be indefinitely drawn upon without some steps being taken to make deposits to the credit of the account. Colloidal material is the agency through which such credit may be effectively restored to the soil. This is possible because of the great adsorbing or holding power of the soil colloids for mineral constituents. This appears to be characteristic of both the mineral and the organic portion of the colloid. When plant foods are added in the form of fertilizers to a soil of normal colloid content, only a part of the water-soluble material added may be taken up immediately by a growing crop. The rest may be held by the colloids in such a way that the loss in drainage water is but very slight. Thus the crop of a later season may share the benefits, and the balance not used may accrue to the credit of plant food.

Not all plant food of soil colloids is "subject to check" by growing plants; some is "on time deposit," and additional requirements must be met before it is available for use. Organic matter frequently serves

in this capacity. In addition to serving other beneficial purposes, organic matter is a source of readily available plant food. Recent investigations have emphasized the availability of its plant-food constituents and its relatively high capacity for retaining plant food as compared with the mineral portion of the colloids of the less fertile soils. Regardless of the kind of mineral colloid each load of manure added and each crop residue turned under becomes a "credit slip" to the plant-food account.

Some Soils Difficult to Build Up

If a soil has a very low colloid content, as is the case in very sandy soils, banking facilities are not at hand, and valuable plant food may be lost. Even organic matter may be rapidly decomposed and much of its value washed away. Nitrates especially are leached out in the drainage water. Under such conditions plants must be fed in a hand-to-mouth manner without the expectancy of building a bank account for the future. It is extremely difficult under certain conditions to build up the fertility of sandy soils, or even of some soils of finer texture containing certain kinds of colloidal material, beyond the necessities of a single season. Such soils for profitable use require frequent additions of quickly available plant food. Any attempt to treat them as storehouses of plant food as in the case of most medium and heavy soils is apt to mean plant food wasted.

M. S. Anderson,
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SOYBEAN Industry Is Rapidly Developing in United States A manufacturing industry, using soybeans as the raw product, is developing rapidly in the United States. The basis of this industry—the soybean itself—is by no means new. The soybean has been grown in the Orient since ancient times, and its many uses make it the most valuable legume grown in that part of the world.

The soybean was introduced into the United States as early as 1804, but only in the last 10 years have we really begun to appreciate it. Production is now reaching commercial proportions. The crop has many things in its favor. It produces a large yield of beans and an excellent quality of forage. Soybeans are easy to grow and to harvest. The crop is relatively free from insect enemies and plant diseases. Finally, the beans themselves have great possibilities in the production of oil, meal, and human food and industrial products. Soybean production in the United States will continue to increase as we find better methods and machinery for handling the crop and still more uses for the soybean and its products for industrial purposes.

And right here is where the minds of industry are working to give a permanent market for this crop. Most of the soybeans produced in the United States above those required for planting purposes have been crushed for oil and meal for several years. But almost overnight this industry has reached proportions that warrant its support by growers of soybeans and users of soybean products. Soybeans yield,

per ton when crushed, about 250 to 300 pounds of oil, 1,600 to 1,650 pounds of meal, with about 100 to 150 pounds milling loss.

Soybean Oil is Semidrying

Soybean oil is a semidrying oil. At present, about 75 per cent of the soybean oil used in the United States, both domestic and imported, is used by the paint and varnish industry and in the manufacture of linoleum, oilcloth, and artificial leather. Smaller quantities are used in the manufacture of liquid soaps, printer's ink, and other products.

Soybean meal is often referred to as merely a by-product of the manufacture of soybean oil. As a matter of fact, the meal obtained from crushing a ton of soybeans is worth 50 per cent to 60 per cent more than the oil. It is the demand for the meal which seems to hold promise for the future of the soybean-crushing industry. Thousands of tons are now being used in the manufacture of mixed dairy feeds and in poultry mash. Another outlet for the meal is in the manufacture of glue for use in the building-material, furniture, and other industries. So great has the demand for this product become that imports during the year ended June 30, 1929, totaled 76,000 tons. This is more than double the quantity imported during the 12 months ended June 30, 1928.

There is also a potential outlet for the soybean and its products in the preparation of various articles of human food. Several agencies have attempted to commercialize these products with varying degrees of success. Among the products which have been given attention are: Soybean flour (used largely in the feeding of diabetics); breakfast foods; soy sauce; and preparations for infant feeding. As research work in this field progresses the manufacture and use of these and other food products may be expected to increase.

Crushers Need Constant Supply

The farmer's main interest in the soybean industry is a dollars-and-cents proposition. Domestic crushings would have to more than double to offset the quantities of oil and meal now imported and used by various industries. Crushers must have a constant supply of soybeans in order to operate continuously. This in turn enables them to contract their capacity output with manufacturers using soybean products. Several mills in the Middle West contracted with growers for large acreages in advance of the 1929 crop harvest at a guaranteed price. The price is based on United States No. 2 grade soybeans, inspected on delivery by a Federal inspector. This plan was tried out for the first time in 1928 with mutual satisfaction to the contracting parties, and is doing much to stimulate the soybean-growing industry and to promote confidence in the soybean as a cash crop.

Given the support of agriculture, the soybean-crushing industry should develop rapidly, and as it develops the soybean grower will profit.

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SOYBEANS Are Valuable for Silage When Grown With Other Feed Crops A number of promising silage crops, adapted to cane-belt conditions, have been raised and fed to beef cattle in a series of experiments at the Iberia Livestock Experiment Farm near Jeanerette, La. Corn produces a lower tonnage there than in northern latitudes and is often damaged by cane borers. Biloxi soybeans, however, grow luxuriantly, and the plan of ensiling mixtures of this legume and other crops is being studied to determine which combination is the best.

Silage has been made for a series of years, in these experiments, from corn, sorgo (saccharine sorghum), shallu (a nonsaccharine sorghum), Japanese sugarcane, and sugarcane, each ensiled alone and also with approximately one-third, by weight, of Biloxi soybeans. Chemical analyses of samples of the silage of each experiment, made by the Louisiana experiment station, showed that the addition of soybeans increased its crude protein and fat content. These silages were fed to young steers with a concentrate ration made mainly of cottonseed meal and rice by-products.

In four feeding experiments sorgo silage was compared with sorgo and soybean silage. In two of these, sorgo silage produced 5 per cent greater gains and more economical gains than sorgo and soybean silage. However, in the other two experiments the sorgo and soybean silage produced so much more economical and rapid gains than the sorgo silage that as an average for the four experiments about 15 per cent more feed was required and about 15 per cent less gain was made by the sorgo-silage lots than by the lots receiving sorgo and soybean silage.

Corn and Soybean Silage

In the case of seven experiments comparing corn silage with corn and soybean silage, the corn silage made the best showing three years, the corn and soybean silage the best for the next three years, while the other year they were practically the same. The averages for the experiments show that corn and soybean silage produced gains which were equally rapid and as economical as corn alone.

The Biloxi soybean—then without a name—was introduced by the department in 1908, from China. It was placed in the care of the late S. M. Tracy, who had charge of a proving ground for new-plant introductions at Biloxi, Miss. The variety was found to make a very vigorous growth there, and in 1914 Professor Tracy began to distribute it under the name it now bears. It found favor at once because it was very hardy and vigorous in growth. It also proved to be suitable to a wide range of variation of soils and climatic conditions and is especially suited to the Gulf coast region.

The planting of corn and soybeans, in alternate hills, in the same row, at the same time, so that the two crops may be cultivated together, has come to be the most popular method of planting soybeans in the Gulf coast territory. Some county agents in Louisiana estimate that from 90 to 95 per cent of the corn acreage of their counties is thus interplanted with soybeans.

They have found that beans planted in this manner do not materially reduce the yield of corn grain, also that they do reduce the cost of cultivation by shading out grass and weeds during the cultivating season. For silage the combined crop of corn and soybeans gives a

greater tonnage than either crop alone. In 5-foot rows with cornstalks 18 inches apart, one to two stalks in the hill, and a thick interplanting of soybeans, one may expect from 5 to 6 tons of corn and nearly as much beans. Late-planted corn makes a larger stalk, causing a larger ratio of corn to beans.

Perplexing Soybean Harvesting Problems

The problem of fully utilizing the crop on the farm has not been solved, though it is hoped that the experiments, here described, will help to reduce much of the present waste. Harvesting the seed in the South comes at a time that interferes with cane and rice harvests, and to some extent with cotton picking. Seed-harvesting machinery for this rank growing bean is inefficient. The middle and late summer period is generally too rainy to permit haymaking on an extensive scale, and silos have not come into general use. A large portion of the crop is, therefore, used only as a soil-enriching crop. Many soils are reaching

FIGURE 172.—Corn and Biloxi soybeans grown in rows 5 feet apart, in Louisiana

the stage where cotton, grown following a crop of soybeans turned under, makes too much growth of stalk and leaves, and farmers are looking for a more profitable way to use that part of the soybean crop which is in excess of their seed and hay requirements. Accordingly, the use of soybeans for silage, in combination with other feed crops, is a promising means of utilization.

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STARCHES from Cannas and Dasheens May Aid the Textile Industry Dasheens and edible cannas hitherto grown chiefly for use as food are now being studied by the Bureau of Home Economics as a source of starch for the commercial sizing of textiles. In view of the fact that the Hawaii Agricultural Experiment Station in cooperation with the United States Department of Agriculture has done considerable work on the cultivation and development of the edible canna and that the

Bureau of Plant Industry has been interested in extending the use of the dasheen, it has been thought of sufficient importance to make extensive study of the properties of these starches.

The edible canna and dasheen plants grow very readily in tropical and semitropical climates and produce large tuberous rootstocks from which starch can be easily and cheaply extracted. The edible canna in appearance is very similar to the flowering variety of canna often seen in the flower gardens of this country. However, it does not have the same gorgeous blossoms, for this plant seems to give all its strength to the excessive growth of stems and rootstocks. In the process of extracting the starch the rootstocks are washed and grated, the pulp together with large quantities of water is screened to remove fibrous materials, and the starch is allowed to settle out by the sedimentation process or is removed by a centrifuge. After repeated washings in water the starch is dried and is ready for use.

Dasheen Commercially Grown Since 1913

The dasheen is a variety of taro. It has been grown commercially in the Southern States since 1913. The tuberous growth on the dasheen consists of one or more large edible central corms and several edible cormels, which, as analyzed, have a starch content of approximately 26 per cent. Although the size of the starch grain is extremely small and a gummy substance prevents rapid settling of the granules when suspended in water, it has been found in this laboratory that the starch can be extracted easily by grinding the dasheens, kneading the pulp under water, and settling out the starch by means of a centrifuge. After several washings in fresh water and centrifuging, the starch is pure and free from protein and may be dried.

The canna starch used for tests was obtained from the Hawaii Agricultural Experiment Station. It is a lustrous starch and is characterized by its very large granules. When heated with water it forms a viscous paste which has great stiffening power in the sizing of fabrics. This stiffness has been quantitatively measured and found to be greater than that of wheat starch, which has the highest value of the more common textile-sizing starches—wheat, rice, corn, and potato. Because of the high viscosity of the paste the stiffening property may be due entirely to a coating over of the fabric with the paste rather than to a thorough penetration into the fabric. Experiments are now being carried on with a view to correlating stiffness with the penetration of the starch into the fabric.

Dasheen starch when tested for its stiffening power in fabrics was found to have a value almost as great as canna starch. Since swollen starch granules are known to exist in starch pastes, and since the dasheen granule is even smaller than that of rice, it is assumed that there is greater penetration of the dasheen starch into the fabric. If a fabric sized with dasheen starch is ironed it should have a desirable glossy finish.

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84722°—30——32

STARCHES Imported for Some Uses, Though U. S. Makes Surplus Cornstarch Starch is obtained commercially from relatively few plant products, although it occurs in practically all forms of vegetable life. Most of the commercial starches are obtained from corn, potatoes, wheat, rice, cassava or manioc, sago palms, and arrowroot. The greater part of the starch produced and consumed in the United States is cornstarch. Potato starch is the most important starch produced and consumed in Europe, but it is of much less importance in the United States. Its production in the United States is small and is decreasing, whereas the imports of potato starch have already exceeded the domestic production, and are increasing.

The manufacture of wheat starch ceased in the United States during the World War, but it is now being produced by two factories. The importation of both wheat starch and rice starch has been increasing since the war. In 1922, 62,556 pounds of rice starch and 210 pounds of wheat starch were imported; in 1927 the importation of rice starch was 251,038 pounds and of wheat starch 46,076 pounds. Some Florida arrowroot (Zamia or wild sago starch) is being produced, but there is no production of true arrowroot, cassava, or sago starches in the United States. These three starches are therefore imported.

Table 18 and Figure 173 give a summary and analysis, as far as is possible with the data available, of the domestic consumption of the starches used in the United States. Because of the absence of detailed data for all the years given in the table, it was not possible to determine the consumption of wheat, rice, and arrowroot starches separately. The figures for cassava starch (tapioca flour) and sago starch (sago flour) include, in addition to the pure starches, cassava and crude sago, respectively, but the importation of these is relatively small as compared with the importation of the pure powdered cassava and sago starches.

TABLE 18.—*Production, consumption, exports, and imports of starch in the United States for stated years* [1]

CORNSTARCH

Calendar year	Domestic production	Total exports [2]	Imports for consumption in United States	Domestic consumption	
				Total	Percentage of all starches
	Pounds	*Pounds*	*Pounds*	*Pounds*	
1904	311, 140, 814	56, 102, 679		255, 038, 135	72. 78
1909	[3] 638, 825, 366	36, 549, 910		602, 275, 456	82. 39
1914	[3] 574, 247, 697	62, 023, 600		512, 224, 097	78. 21
1919	727, 962, 234	269, 140, 557		458, 821, 677	74. 39
1921	860, 224, 469	257, 795, 466		602, 429, 003	86. 35
1923	839, 382, 402	204, 235, 141	25, 140	635, 172, 401	82. 72
1925	854, 125, 467	232, 749, 350	64	621, 376, 181	79. 89
1927	1, 012, 175, 194	[4] 252, 521, 207	14, 140	759, 668, 127	82. 10
Average					79. 85

[1] The data upon which these figures are based were compiled from the following:
Domestic production from Thirteenth and Fourteenth Censuses of the United States; Census of Manufactures of the United States for 1923, 1925, 1927; Tariff Information Survey G-33, 1921.
Imports and exports from Foreign Commerce and Navigation of the United States, Bur. Foreign and Domestic Commerce, Dept. of Commerce.
[2] Almost entirely cornstarch. Data on cornstarch for table use not available.
[3] Includes some starch purchased for reprocessing and mixing.
[4] Includes corn flour.

TABLE 18.—*Production, consumption, exports, and imports of starch in the United States for stated years* [1]—Continued

Calendar year	Domestic production	Total exports [2]	Imports for consumption in United States	Domestic consumption	
				Total	Percentage of all starches
POTATO STARCH					
	Pounds	*Pounds*	*Pounds*	*Pounds*	
1904	27, 709, 400		[5] 4, 438, 038	32, 147, 438	9. 17
1909	24, 873, 415		[5] 15, 418, 259	40, 291, 674	5. 51
1914	23, 540, 472		[5] 13, 934, 741	37, 475, 213	5. 72
1919	16, 477, 186		3, 194, 595	19, 671, 781	3. 19
1921	8, 924, 927		6, 100, 577	15, 025, 504	2. 15
1923	4, 689, 751		11, 981, 565	16, 671, 316	2. 17
1925	10, 127, 556		10, 714, 747	20, 842, 303	2. 68
1927	7, 078, 425		27, 272, 048	34, 350, 473	3. 71
Average					4. 29
TAPIOCA, TAPIOCA FLOUR, AND CASSAVA					
1904			[5 6] 36, 640, 206	[5 6] 36, 640, 206	10. 46
1909			[5 6] 56, 363, 629	[5 6] 56, 363, 629	7. 71
1914			[5] 71, 304, 728	[5] 71, 304, 728	10. 89
1919			95, 652, 649	95, 652, 649	15. 51
1921			50, 458, 450	50, 458, 450	7. 23
1923			93, 882, 460	93, 882, 460	12. 23
1925			118, 411, 974	118, 411, 974	15. 22
1927			110, 408, 412	110, 408, 412	11. 93
Average					11. 40
SAGO: CRUDE AND SAGO FLOUR					
1904			[5 7] 5, 845, 268	[5 7] 5, 845, 268	1. 67
1909			[5 7] 16, 796, 780	[5 7] 16, 796, 780	2. 30
1914			[5] 9, 970, 717	[5] 9, 970, 717	1. 52
1919			2, 900, 936	2, 900, 936	. 47
1921			4, 150, 314	4, 150, 314	. 59
1923			7, 452, 941	7, 452, 941	. 97
1925			6, 325, 300	6, 325, 300	. 81
1927			5, 864, 225	5, 864, 225	. 63
Average					1. 12
ALL OTHER					
1904	17, 845, 121		[5 8] 2, 903, 283	20, 748, 404	5. 92
1909	13, 836, 866		[5 8] 1, 484, 770	15, 321, 636	2. 10
1914	22, 976, 178		[5 8] 962, 314	23, 938, 492	3. 66
1919	39, 073, 667		[8] 659, 765	39, 733, 432	6. 44
1921	24, 905, 011		[8] 694, 986	25, 599, 997	3. 67
1923	14, 323, 043		[8] 323, 814	14, 646, 857	1. 91
1925	[9] 10, 055, 271		[8] 812, 914	10, 868, 185	1. 40
1927	[9] 13, 311, 252		[8] 1, 641, 074	14, 952, 326	1. 62
Average					3. 34
TOTALS					
1904	[10 11] 356, 695, 335	56, 102, 679	[5] 49, 826, 795	350, 419, 451	[12] 50. 77
1909	[10] 677, 535, 647	36, 549, 910	[5] 90, 063, 438	731, 049, 175	[12] 105. 92
1914	[10] 620, 764, 347	62, 023, 600	[5] 96, 172, 500	654, 913, 247	[12] 94. 89
1919	[10] 783, 513, 087	269, 140, 557	102, 407, 945	616, 780, 475	[12] 89. 36
1921	[10] 894, 054, 407	257, 795, 466	61, 404, 327	697, 663, 268	[12] 101. 08
1923	[10] 858, 395, 196	204, 235, 141	113, 665, 920	767, 825, 975	[12] 111. 24
1925	[10] 874, 308, 294	232, 749, 350	136, 264, 999	777, 823, 943	[12] 112. 69
1927	[10] 1, 032, 564, 871	[4] 252, 521, 207	145, 199, 899	925, 243, 563	[12] 134. 05
Average				690, 214, 887	

[4] Includes corn flour.
[5] Fiscal-year figures.
[6] Not specified as including tapioca flour.
[7] Not specified as including sago flour.
[8] Rice starch, wheat starch, and all preparations fit for use as starch not separately provided for.
[9] Wheat starch and starch processed and packed.
[10] Includes an indeterminate amount of duplication due to the fact that the starch is made by certain establishments and sold to other establishments in the industry which use it as a material in the manufacture of other products.
[11] In addition, 1,309,691 pounds of cornstarch were made by establishments engaged primarily in the manufacture of products other than those covered by the industry designated.
[12] Per cent of the average total of 690,214,887 pounds.

Cornstarch Consumption 80 Per Cent of Total

In the United States the consumption of cornstarch averages, for the years given in Table 18, about 80 per cent of the total starch consumed. Cassava starch (tapioca flour) is next in importance, averaging about 11 per cent, potato starch about 4 per cent, sago starch about 1 per cent, and all other starches, which include rice, wheat, and arrowroot starches, about 3 per cent.

In general, for the period from 1904 to 1927 there have been no radical shifts in the relative consumption of the various commercial starches. The general average trends in each case are summarized as follows (fig. 173): There has been a slight increase in the percentage of cornstarch used in this country. Also, the consumption of cassava starch has increased. On the other hand, there has been a slight decrease in the percentage of potato starch, of sago, and of other starches consumed in this country.

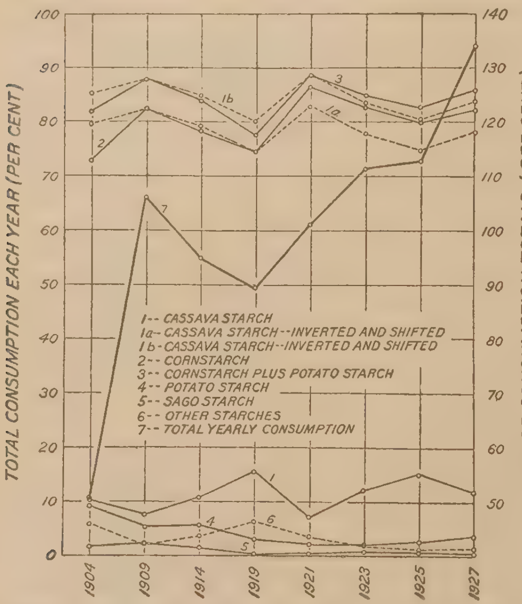

FIGURE 173.—General average trends in the consumption of starches in the United States

As regards the total quantity of starch used (Table 18 and fig. 173), there has been a marked increase for the period, with the exception of a drop during the war when the demand for starches for industrial purposes was subordinated to the need of the raw materials for food. During the war period there was a great demand for starch substitutes, but after the close of the war they were not of such importance.

Owing to the fact that each kind of starch has its special properties, one kind of starch is used for certain purposes even when there may be lower-priced starches available. It can hardly be expected therefore that any one kind, such for example, as cornstarch, will completely displace all other kinds of starch in this country.

Competing Kinds of Starch

Anyone not acquainted with the differences between the various kinds of starch may find it hard to understand the statistics given in Table 18 or why, with the rapid development of the cornstarch industry in recent years, other kinds of starch should continue to be imported. The production of cornstarch in this country each year since the war has exceeded the total consumption of all starches in the United States. The competition with such a strong, rapidly develop-

ing industry is undoubtedly responsible for the relatively small quantities of potato, wheat, rice, and sago starches consumed in the United States, these being used mainly for purposes that require starches having special properties. On the other hand, tapioca or cassava starch, as will be seen from Table 18 and Figure 173, is more of a competitor of cornstarch for those uses which do not require a starch having special properties. The market price of cassava starch (tapioca flour) is generally very nearly the same as that for cornstarch.

With these facts in mind, it will be of interest to examine the curves in Figure 173. Upon first examination of curve 1 for cassava starch and curve 2 for cornstarch, it will appear that there is an increase in consumption of cornstarch when there is a decrease in consumption of cassava starch, and a decrease in consumption of cornstarch when there is an increase in consumption of cassava starch. Further, the increase of one is about of the same magnitude as the decrease of the other. If curve 1 for cassava starch is inverted and placed near curve 2 for cornstarch, as in curve 1a, the correlation is more easily seen. Further, since potato starch is more of a competitor of cassava starch for use in making certain dextrins, than is cornstarch, a comparison of curve 3 showing the consumption of potato starch and cornstarch with the inverted curve for cassava starch (curve 1b) makes the correlation even closer. The curves would probably be found to approach even more closely if from the figures for the consumption of cornstarch should be deducted the quantity of cornstarch exported in the form of dextrin and modified starch. Since the war the United States has been exporting increasing quantities of dextrin, the dextrin industry in this country having been developed as a result of the war. No figures are given for exports of dextrins before the war. These correlations show, therefore, very decidedly that increased consumption of cassava starch causes a decreased consumption of cornstarch.

Use by Various Industries

Table 19 shows the distribution of the cornstarch used by various industries, expressed in percentage of total production and also percentage of domestic consumption, for the years 1918, 1925, 1926, and 1927. In some cases there has been a definite change in the distribution of the cornstarch for domestic consumption. Its use by bakers, flour mills, and mixers has decreased. The high figure for 1918 is without doubt due to the war emergency need for supplementing wheat flour with other materials for bread and bakers' goods. Owing to national prohibition, there has been a decided drop in the use of starch in the form of refined grits by brewers since 1918. The consumption of cornstarch (not in the form of glucose or sugar made from starch) for the manufacture of confections was low in 1918 because of the war-time restriction of the production of confections. War-time conditions may also explain the change in the use of cornstarch by chemists, color manufacturers, and manufacturers of explosives. There was a distinct increase in the use of cornstarch for manufacture into dextrin, exports of which have increased since the war. There was a small increase in the use of cornstarch for paper, paper box, paste, billboard, and asbestos, but a gradual decrease in the consumption of cornstarch by the laundry trade. The use of cornstarch for

textile purposes has increased decidedly, probably owing to the use of so-called soluble or thin boiling starches.

TABLE 19.—*Relative consumption of cornstarch used by various industries in stated periods*

Industry	Percentage of total production in—				Percentage of total domestic consumption in—			
	First half of 1918 [1]	1925 [2]	First half of 1926 [2]	1927 [3]	First half of 1918 [4]	1925 [5]	First half of 1926 [5]	1927 [3]
Bakers, bakers' supply, flour mills, and mixers	15.4	2.3	2.6	2.5	15.8	3.3	3.5	3.5
Baking-powder manufacturers	6.2	5.3	5.6	5.2	6.4	7.5	7.5	7.2
Brewers (refined grits)	7.1	0.1	0.2	0.4	7.3	0.1	0.3	0.6
Confectioners and confectioners' supply	2.3	4.2	4.0	3.5	2.4	5.9	5.4	4.8
Chemists, color manufacturers, and explosives	2.5	3.0	3.1	3.2	2.6	4.2	4.2	4.4
Dealers and repackers (bulk)	4.8	7.9	5.9	4.5	4.9	11.2	7.9	6.2
Dextrin makers and founders	9.5	3.4	5.1	8.5	9.9	4.8	6.8	11.7
Paper, paper box, paste, billboard, and asbestos	3.9	6.4	6.7	7.7	4.1	9.1	9.0	10.6
Grocers (packages)	21.4	17.1	20.9	14.4	22.1	24.2	28.1	19.9
Laundry (bulk to laundry trade)	2.7	1.8	1.7	1.6	2.8	2.5	2.3	2.2
Cotton mills and other textiles	15.8	13.4	13.8	16.1	16.3	19.0	18.5	22.2
Miscellaneous	5.4	5.4	5.0	4.8	5.6	7.6	6.7	6.7
Export	3.1	29.4	25.5	27.5				

[1] War service committee on corn products; Prices of Corn and Corn Products, H. F. Bruning, [U. S.] War Indus. Board, Price Bull. 10: 13 (1919); Starch and Related Materials, U. S. Tariff Com., Tariff Inform. Surveys G-33: 10 (1921).
[2] Starch Production and Trade of Leading Countries, J. A. LeClerc, Com. Rpts. (Dec. 6, 1926), No. 49: 615.
[3] Calculated from data in Development of the Corn Starch Industry in the United States, F. T. Pope Com. Rpts. (July 16, 1928), No. 29: 160.
[4] Calculated from data given in reference under footnote 1.
[5] Calculated from data given in reference under footnote 2.

In recent years these thin boiling starches have been used in increasing quantities. They are of great value in many industries, especially in sizing and stiffening cotton goods. They have reached the same commercial importance as dextrins. This is especially the case with cornstarch. Modifying cornstarch is said to make it more suitable for textile purposes than is the raw cornstarch by giving it properties more nearly approaching starches from other vegetable sources. These soluble or thin boiling starches greatly resemble in appearance the raw starch from which they are made.

Although the use of cornstarch for laundry purposes is decreasing, as shown in Table 19, it is claimed that thin boiling cornstarch is replacing to a large extent wheat and rice starches, which have been used extensively in laundry work in the past. The probable explanation for this apparent contradiction is that there has been a decided change in the starching of laundered clothes. Whereas it was formerly customary for women to wear very stiffly starched long skirts and similarly starched underskirts and for men to wear stiffly starched collars, cuffs, and shirt fronts, shorter dresses with soft finish and soft shirts with soft collars and cuffs are now seen.

These changes in custom might be thought to lead to a decreased use of cornstarch for textile purposes, rather than the increased use shown by the data, but although to-day women's dresses are scantier and contain less starch, women have more dresses than formerly. Also, exports in textiles have increased. The increased use of artificial silk and brighter colored and print goods has also caused changes in the kind of materials used in sizing and finishing.

Starches treated with alkali have become important as adhesives. Alkali starch glues or "vegetable glues" are now used almost exclusively for wood veneering in the manufacture of furniture, wood panels, and other types of woodworking. These vegetable glues have displaced animal glue to a very great extent for such work. Cassava starch is used almost exclusively for the manufacture of vegetable glue and in the manufacturing of dextrin for postage stamps and envelopes, although other kinds of starch can be used. It is asserted, however, that other kinds of starch yield alkali starches which do not give as satisfactory results when used for woodworking.

There is also an increased production of starches which will swell in cold water to form pastes having properties similar to starch gelatinized at higher temperatures.

Although, as previously stated, it can hardly be expected that any one kind of starch will completely displace all other kinds, undoubtedly our increasing knowledge of the properties of starches, changes in fashions, and other economic changes will have their influence on the kind as well as the quantity of starches used in the future.

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STRAWBERRY Called the Blakemore Is a Good Dual-Purpose Variety

A new strawberry of excellent flavor, the Blakemore, is the outstanding result of crosses of the Missionary and Howard 17 (*Premier*) varieties made at the United States plant field station at Glenn Dale, Md., in 1923. It is rapidly gaining favor as a market variety because of its firmness, bright light-red color, and uniform shape. It has been tested by the National Preservers' Association and is considered by them as superior to all known commercial varieties for preserving. It has been tested in commercial plantings up to the present time in the strawberry areas from New Jersey to North Carolina and is recommended for that part of the United States. It has not succeeded in the Pacific Northwest, but it should be tested in all regions where the Missionary and the Klondike are grown, as well as in the southern part of regions where the Howard 17 is grown.

Not only has the Blakemore variety shown superior market and preserving qualities, but its characteristics make it well adapted to the present matted-row system of growing strawberries, the method commonly used along the Atlantic coast. It produces plants fully as freely as the Missionary and more freely than the Howard 17. It is more vigorous than either variety, under many conditions at least, and is more resistant to leaf scorch than the Missionary. Limited tests under the hill system indicate that it is also well adapted to that method of culture. Plants kept in hills form many crowns and numerous fruit clusters, hence the production per acre is relatively high under this system.

Has Both Market and Preserving Qualities

The present and prospective importance of strawberry products increases the usefulness of a dual-purpose variety such as the Blakemore. The combination of exceptional market and preserving quali-

ties in one variety enables growers to find more than one outlet for their crop. It is estimated that more than 110,000 barrels of strawberries, or the equivalent of nearly 5,000 cars of fresh berries, were frozen in 1928, chiefly for the preserving and ice-cream industries. The freezing of strawberries has increased steadily in importance in recent years. Better preserves can be made from the barreled berries than from fresh berries, so that the fact that the Blakemore lends itself especially well to preserving and is superior to all known varieties for this purpose widens the market for this variety.

FIGURE 174.—A plant of the Blakemore strawberry at Willard, N. C., producing its "crown" crop. In North Carolina and southward the Blakemore and some other strawberry varieties produce a late spring crop, the "crown" crop, which follows the usual spring crop. This photograph was taken on June 6

Compared with varieties now grown in North Carolina, the season of the Blakemore is about the same as that of the Klondike, a few day earlier than the Missionary, and 10 days to 2 weeks earlier than Howard 17. In Maryland all of these varieties ripen about the same time. The Blakemore has been more productive than the above varieties under conditions so far tested in the area from New Jersey to North Carolina, but may not be as productive under other conditions, especially on very light soils. (Fig. 174.)

Berries of Good Size

The berries are of good size, slightly larger and more uniform in shape than those of the Missionary. They do not have the long point of the Missionary and have a slight neck. (Fig. 175.) The berries are firmer than the Missionary, Klondike, or Howard 17. Their bright light-red color does not change on standing, whereas the Missionary darkens quickly, and the Klondike and Howard 17 darken somewhat more slowly than the Missionary. It is an acid berry of the Missionary and Klondike type, though slightly less acid than either. Its easy hulling (capping) qualities, uniform shape, firm and solid flesh, light bright-red color (that

FIGURE 175.—Fruit cluster of the Blakemore strawberry illustrating its shape as grown in New Jersey. Note also that all fruits are ripe on this cluster and that none have spoiled

changes relatively little on cooking), and its high pectin content and excellent flavor make it superior for preserving.

The variety is named for Marcus Blakemore, the first president of the National Preservers' Association, in recognition of his public service in connection with the preserved-food industry. The United States Department of Agriculture has no plants for distribution, but plants may be obtained from cooperating nurseries in the areas to which the variety is adapted.

GEORGE M. DARROW,
Senior Pomologist,
GEORGE F. WALDO,
Assistant Pomologist,
Bureau of Plant Industry.

SUGAR-BEET Leaf-Hopper Problem Involves Study of Associated Insects The desert breeding grounds of the sugar-beet leaf hopper in southern Idaho have been the locale for extensive investigations on the biology and behavior of the insect during the past year. In these areas, principally composed of abandoned dry-farm lands, vast areas are given over to the host plants of the insect. In addition to the sugar-beet leaf hopper, large populations of other insect species maintain themselves on these plants. Some of these are of economic importance and others potentially so. The entire insect community living on these host plants has been studied, each species being recorded throughout the season, both as to numbers and host plants. This study is being conducted in the belief that the insects associated on these plants constitute a complex social organization whose separate parts are intimately related to each other, and that no single insect species, such as the sugar-beet leaf hopper, can be properly studied without considering its relationships to other insects associated with it on their common food plants.

Data of this type become increasingly valuable as the record of a series of years is obtained, and are of direct application, not only to the problem presented by the sugar-beet leaf hopper but also to other insect problems of southern Idaho. Since extensive traveling must be done throughout the arid regions of the West in connection with biological studies of the leaf hopper in many widely separated localities, the insects associated with it can be studied in comparatively little additional time throughout a wide geographic range. These studies are aimed primarily at a proper understanding of the leaf hopper's biology throughout its entire economic range, with the hope that the information so obtained will be useful in safeguarding the production of sugar beets. One of these projects is concerned with the mapping of the entire western area with respect to breeding grounds and dispersion areas of the insect. Another is the locating of areas which might, from the standpoint of the leaf hopper, be safe for beet culture. A third activity deals with the discovery of areas which might support the beet industry if information were available as to the years of probable leaf-hopper invasion.

Climate and Weather the Chief Factors

It can safely be said that climate and weather are the two determining factors in the development and abundance of the sugar-beet

leaf hopper. With this in mind there has been attempted a study of the effect of climate and weather on populations of this insect. Again, the data accumulated from the study of the leaf hopper, in relation to the insect community in which it lives, has been the basis for this study, which is expected to show the ebb and flow of the different species of insects in the community, and the association of such changes with certain weather types. With the increase in the length of the series of data on this relationship it will become possible to associate certain weather types with the activity of various species of insects. In so far as these relationships hold true it will be possible to thus lay down a basis for ascertaining in advance the probabilities of insect damage in the case of many species injurious to the crops in the area under consideration. Even species which at present are not known to be of economic importance are well worth study, since, if they do not become of importance to cultivated crops, their reactions to climate may give clues to the activity of economic species whose development and abundance in relation to weather are difficult to determine.

In the case of the sugar-beet leaf hopper, the prediction of outbreaks in the southern Idaho area has now passed its third successful year. Prior to the initiation of this investigation, the acreage of sugar beets was always at a maximum in the years of heaviest leaf-hopper damage. Since predictions have been made this situation has been completely reversed, with the result that the season of 1929 witnessed the largest successful acreage of beets ever grown in the area under consideration.

The predictions of probable leaf-hopper conditions have been issued by the end of February, and, notwithstanding the vagaries of the weather afterwards, the insect situation indicated at the end of February has been confirmed at harvest time. This experience to date has thus provided an excellent demonstration of the practical value of studies on the relation between weather type and insect abundance. An extension of the prediction service is under consideration, and data are being accumulated to permit the prediction of the time and probability of leaf-hopper migrations. This information will be of great value in connection with such other crops as beans, which are susceptible to damage by the insect and which are grown in large quantity in the area under study. Similar studies in other States have indicated that there are other sugar-beet areas which could be benefited by the issuance of predictions of leaf-hopper migrations, and these areas are being studied so that information on this subject will be available whenever needed.

Control Problem Is Complex

The problem of control of the sugar-beet leaf hopper is a very complex one. Direct control measures such as sprays have been tried again, but with disappointing results, since it is extremely difficult to kill the insect before it has had an opportunity to transmit the curly-top virus to the plants. A more fundamental study of direct control measures has been initiated, as it is recognized that the development of successful direct control methods would be of immense benefit to the industry.

Control of injurious insects by introduction of parasites has tremendous popular appeal. In the case of the sugar-beet leaf hopper, search

was made for egg parasites. In doing so the range of the leaf hopper was found to extend a long distance into Mexico, but the egg parasites found there were identical with those already known in the breeding grounds of the leaf hopper in the Western States. Work on the life history of the egg parasites is well under way, and information can be confidently expected to show why the native egg parasites are not more effective. This information will make it possible to again attack the problem of introduction of parasites of the sugar-beet leaf hopper.

WALTER CARTER,
Senior Entomologist, Bureau of Entomology.

SWEETCLOVER Growing by New Methods Is Giving Good Results Sweetclover has so recently been added to the list of important American forage crops that new methods of growing and using the plant are constantly being found.

In the past a serious obstacle to its wider utilization has been its extreme sensitiveness to sour soil. Ordinarily sweetclover does not thrive unless there is plenty of lime in the soil. Since a large percentage of American soils are lacking in lime and are sour, it has become a very general practice to add a ton or more of lime per acre before sweetclover is sown.

Recently there have been indications that on soils which are only slightly sour sweetclover may be grown successfully with a relatively small quantity of lime by drilling the lime with the seed. The method is to mix 400 to 500 pounds of hydrated lime per acre with the seed and sow the mixture through the fertilizer attachment of a wheat drill. Applied in this way, the lime falls close to the seed, where it is immediately available to the seedlings. Apparently the seedling stage is the critical time with respect to lime requirement, and if the seedlings become established the plants thrive. As yet information is incomplete as to the particular soils where this practice is successful, but whenever the lime deficiency is not too great the method is well worth trying.

Occasionally it is possible to dispense with lime entirely by drilling 200 to 300 pounds of superphosphate per acre with the seed. This practice seems to be limited, however, to areas where the surface soil only is sour.

The Double Inoculation Method

Another common difficulty in growing sweetclover has been to obtain good inoculation of the roots. A practice which has been quite successful is the so-called double-inoculation method. With this method both laboratory culture and inoculated soil are used. The seed is first treated with the prepared culture and then mixed with three or four times its bulk of sifted soil from an old sweetclover field. Good inoculation usually follows the sowing of this mixture.

Everyone who has bought sweetclover seed is familiar with the expression "scarified seed." By this is meant seed which has been scratched or scarified in a machine to permit rapid absorption of moisture and quick germination. Scarified seed undoubtedly is the best kind to use when planting in late spring or in summer when

immediate germination is desired. For planting in late fall or winter a better method is to use the unhulled seed just as it comes from the plant. In most of the Central and Eastern States unhulled seed scattered on a frozen wheat field in January or February has proved to be one of the cheapest and most reliable methods of obtaining a stand. In experiments at the Arlington Experiment Farm, Rosslyn, Va., during the last seven years unhulled seed planted any time between December 15 and February 15 has produced an excellent crop. The seed germinates at the first suitable opportunity in spring, and the young plants obtain a good start while the soil is still cool and before the weeds are well started. Scarified seed can not be safely used for winter planting, because it germinates before danger of killing frosts is past. In the semiarid regions winter planting with

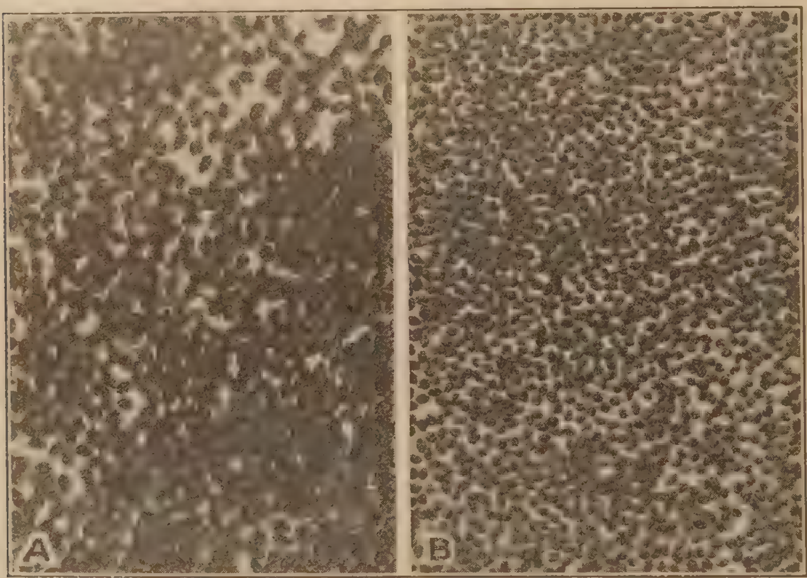

FIGURE 176.—Sweetclover seed, natural size; A, unhulled seed; B, hulled seed

unhulled seed has not been uniformly successful, because the rapid early growth sometimes exhausts the reserve moisture in the soil before midsummer. Unhulled seed may be produced easily and cheaply at home by the use of a seed harvester of the beater type made from an old binder.

Difficulty in Making Sweetclover Hay

Sweetclover hay is often troublesome to make, owing to the difficulty of curing the heavy green stems. Farmers are getting around this difficulty by cutting the hay with a binder. The bound bundles are set up in long, narrow, open shocks like oat shocks and allowed to cure for several days. The quality of the hay thus produced is good, and the expense is little greater than for hay cocked by hand.

In regions where much sweetclover is used for pasture there is an increasing tendency to sow some kind of grass with it. Orchard grass, timothy, redtop, and (in the South) Bermuda grass are the most

popular sorts. There are several advantages of a grass-sweetclover mixture. The grasses fill the vacant spots where the sweetclover failed to catch and thus increase the yield of forage. They give variety to the diet, lessen the danger from bloat, and extend the pasture season at both ends of the year. On soils which heave badly in late winter the grass roots tend to bind the surface soil together and lessen the serious slippage of sweetclover roots.

When grass can not be sown with the sweetclover, a growing practice is to plant a small field of Sudan grass near by. This serves as a reserve pasture to protect the new seeding of sweetclover from overgrazing and also provides late pasturage after the old sweetclover pasture is mature.

Danger of Livestock Bloating

During the last five years there have been an increasing number of complaints of animals bloating on sweetclover pasture. The increase is not out of proportion to the increased acreage of the crop, and sweetclover is still believed to be less likely to cause bloat than alfalfa, red clover, or most other legumes. Nevertheless, bloating on sweetclover does occur, and reasonable precautions to prevent it are necessary.

Bloating is usually due to animals gorging themselves on green, succulent feed. One of the best preventives, therefore, is to make sure that the animals are not turned into a sweetclover field while hungry. When cows are brought into the barn to be milked they should be given some hay, silage, or grain before returning to the pasture. Animals that stay on a sweetclover field continuously should have access to hay, straw, or growing grass in addition. In districts having soft water, lime should be put in the drinking water. Even with these precautions the animals should be watched rather closely during May and early June, when the herbage is most tender, and preparations should be made to give immediate treatment with a trocar or some vomiting agent if necessary.

L. W. Kephart,
Senior Agronomist, Bureau of Plant Industry.

SWEETPOTATOES High in Food Value and Vitamin Content Sweetpotatoes have been used as an article of human food for centuries. Ranking second in importance as a truck crop in the United States, they constitute one of the chief vegetable foods in the Southern States. About 1,000,000 acres, with an approximate farm value of $80,000,000, are devoted to the annual commercial production of sweetpotatoes in the United States. In addition, the quantity produced by truckers and small farmers and home gardeners nearly equals that produced commercially.

Sweetpotatoes are primarily an energy-producing food. The edible portion of raw sweetpotatoes has an average fuel value of 570 calories per pound. Besides containing an average of about 18 per cent starch, they also have from 4 to 5 per cent sugar. The percentages in different varieties and in different samples of the same variety vary within wide ranges. A characteristic feature of

sweetpotatoes is that they are naturally rich in diastase, a substance that changes starch into sugar. At ordinary temperature the diastase in the sweetpotato shows but little activity, but at 55° to 65° C. the sugar formation, although not instantaneous, is extremely rapid. Frequently when sweetpotatoes are cooked nearly all the starch is changed into sugar (maltose). Sweetpotatoes as used for human food are, therefore, really a saccharin food, rather than a starchy food.

Protein Content of Sweetpotatoes

As compared with other root vegetables, sweetpotatoes rank high in protein, containing an average of about 2 per cent. Some varieties contain more than 3.5 per cent. Although low in protein as compared with seeds, sweetpotatoes as a nitrogenous food have a significance in nutrition beyond that judged merely on the quantity of the crude protein they contain. In nutrition the quality of a protein must be considered as well as the quantity. Recently the proteins of sweetpotatoes were isolated for the first time, and studied in the protein and nutrition division of the Bureau of Chemistry and Soils. These proteins were found to be a good source of some of the amino acids which are known to be essential for the growth and satisfactory nutrition of animals, and which are lacking or deficient in the proteins of certain seeds and grains. For this reason sweetpotatoes should be a valuable supplement to correct the deficiencies of proteins of corn, wheat, and grains in general, and several of the legume seeds, such as the navy bean, lima bean, cowpea, and lentil.

Sweetpotatoes are richer than potatoes in true protein. Sweetpotatoes and potatoes are usually represented as containing about the same percentages of protein. These percentages are calculated by multiplying the nitrogen content of the material by the factor 6.25. About half, or less, of the nitrogen in potatoes, however, does not represent protein at all, but is present in the form of amides which do not have the food value of proteins. No amides have been found in sweetpotatoes.

Vitamin Content of Sweetpotatoes

The vitamin content of sweetpotatoes is an important consideration in their food value. With the exception of carrots, sweetpotatoes are distinguished from other commonly used edible roots and tubers by their high content of vitamin A. They contain enough vitamin A to justify classifying them with the leafy vegetables as a source of this vitamin. In agreement with many observations that vitamin A in natural products is usually associated with yellow or green pigment, it has been shown that yellow sweetpotatoes contain much more vitamin A than the white varieties. Sweetpotatoes are also a good source of vitamin B (using this designation in the sense of the old terminology) and vitamin C. They contain more vitamin B than many other root crops and compare favorably with those that contain the most. As a source of vitamin C it has been reported that sweetpotato juice has an antiscorbutic value equal to about one-third that of orange juice and about one-half that of peach and pineapple juice. Sweetpotatoes, therefore, can serve as a convenient source of antiscorbutic food when fruit and green vegetables are not readily available. Allowances should be made, however, for loss of vitamins in cooking.

Can Be Preserved as Meal

It has been shown that when properly dried, sweetpotatoes can be ground into a meal or flour which can be preserved indefinitely and which does not lose its flavor when used in making pies and custards. Work done in the Bureau of Chemistry and Soils has demonstrated that sweetpotato flour can be used as a bread improver. A substantial increase in loaf volume occurred when sweetpotato flour was used with wheat flour. One and one-half per cent of sweetpotato flour seemed to give the best results. The texture of the bread, color, and flavor were up to the standard.

A process has also been worked out in the Bureau of Chemistry and Soils for the manufacture of sweetpotato sirup.

Aside from serving as an important article of human food, a significant percentage of the sweetpotato crop is fed to farm animals, especially hogs. There is need of a cheaper and more productive source of carbohydrates than corn for feeding purposes, particularly in the Southern States. Cottonseed, peanut, and soybean meals supply an abundance of protein, but on account of lack of enough carbohydrate material the southerner is likely to be restricted to feeds that contain too much protein in proportion to carbohydrate. Such feeds are not only expensive but do not constitute the most efficient ration. Scarred and cull sweetpotatoes could be used to advantage for feeding purposes, particularly during the early part of the season when the question of storage would not have to be considered. Sweetpotato vines are also of high nutritive value and are much relished by livestock.

D. Breese Jones,
Principal Chemist, Bureau of Chemistry and Soils.

TAX Measurement Is a Complex Job Involving Many Obscure Factors

Measurement of the burden of taxes on farm property or any other type of property is no easy task. The best single means of measuring the burden is found in a comparison of the taxation and the income of the property or the individual that is taxed. Other means of computing tax burden should be considered, but they are of lesser importance.

Taxes on agriculture are largely taxes on farm property. It has been estimated that of the $900,000,000 of taxes which are directly paid by farmers, 84 per cent consists of taxes on tangible farm property. More than 75 per cent of these taxes on tangible property are levied on the land and buildings of the farms. Hence the measurement of the weight of taxation on this property gives a valuable indication of the way in which agriculture is burdened by taxation.

It is not difficult to discover the amount of taxes paid by any piece of farm land. It is a matter of public record and may be ascertained by consulting the books of the proper official. An attempt to discover the income produced by any piece of farm land is less easy. A farmer operating his own farm may be able to state accurately the total net income which he receives from the farm; but when he attempts to separate this income into parts to be assigned to him for his labor and for his managerial ability, and to the land for its part in produc-

tion, he finds that such separation can be made only on the basis of arbitrary assumptions which may be satisfactory in individual cases, but which will not be generally accepted.

Net Income of Rented Land

In sections where a considerable quantity of land is rented for farming purposes the net rent which may be received by the owner of the land represents the income from land and, particularly when the land is rented for cash, little else. It is not difficult to compute the net income of rented land. In the case of real estate rented for cash, depreciation and taxes are usually the only important items to be deducted from gross rent in order to arrive at the net return. In the case of share rent, additional expense items must be subtracted from gross rent. These depend on the local renting contracts and vary from one section to another. Their amount can be computed accurately by the farm owner. In some areas the landlord who rents on shares spends some of his time supervising the use of his land. The value of his time should be one of the deductions from gross rent. In sections in which studies of rent and tax have been conducted this item has been of small importance and has not been considered except in unusual cases. Share-rent figures are dependent on the yields and prices of a particular year and so are subject to wide variation from year to year. Over a period of years, however, these variations tend to counterbalance one another.

Studies in 14 States

Studies of the net return to the landlord on rented farms were made in 14 States for one or more years during the period from 1922 to 1927. A comparison of the taxes with the net rent gives the basis for measuring the weight of taxation. Figure 177 contains such a comparison. The first item which appears in the figure is the number of dollars of net rent received by the landlords after deducting all charges, including taxes and depreciation. Pennsylvania farms reported $4.96 per acre as net return on the farms included in the sample. These farms are largely located in the better farming sections and do not supply data which are as typical of conditions in the State as a whole as do the figures from other States. Iowa farms reported the next highest average net rent, $3.36 per acre. Then came Missouri, Arkansas, Ohio, Indiana, South Dakota, and New Jersey, each with net rent per acre averaging over $2. Washington, Virginia, and North Carolina farms reported net rent from $1.50 to $2 and North Dakota, Colorado, and Michigan reported figures between $1 and $1.50 per acre.

Neither rent nor tax figures on a per-acre basis are significant if they are taken by themselves, but the comparison of the average taxes per acre paid on the farms in the various States will be of interest in illustrating the varying fixed tax charge which must be met by an acre of land in various sections of the country. The highest tax figure was reported in New Jersey, where the average was $2.07 per acre. Pennsylvania, Ohio, and Indiana farms paid taxes of $1.76, $1.62, and $1.50 per acre, respectively. Michigan and Iowa were the only others of the 14 States in which the taxes were over $1 per acre. Virginia, Arkansas, North Dakota, and Colorado reported taxes of 60 cents per acre or less.

The Relationship of Rent to Taxes

The significant part of this discussion concerns the relationship between net rent before taxes are deducted and the taxes that the owner must pay. The States which supplied the material in Figure 177 are arranged in the order of the percentage of net rent (before deducting taxes) which was taken by taxes in the years covered by the investigations. Michigan is at the top of the list. Taxes there during the years from 1923 to 1926, inclusive, took 58 per cent of the net rent

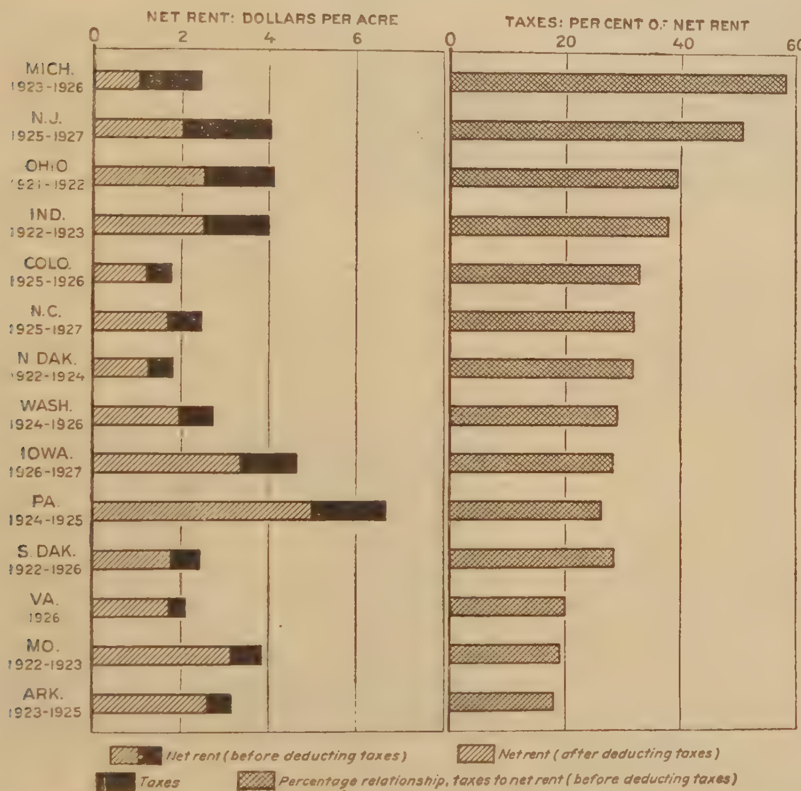

FIGURE 177.—General property tax and net rent on selected farms in 14 States in selected years, 1921–1927

received by the owners of the rented farms. New Jersey, where taxes took 51 per cent of the net rent, was a close second. In Ohio and Indiana taxes took 39 and 38 per cent, respectively. In three States—Colorado, North Carolina, and North Dakota—taxes amounted to between 30 and 35 per cent of net rent.

Thus in half of the States for which data are available taxes amounted to over 30 per cent of the net income which the landowner received from his land. Four States—Washington, Iowa, Pennsylvania, and South Dakota—reported that taxes averaged from 25 to 30 per cent of net rent. In Virginia the percentage was exactly 20, and in Missouri and Arkansas the percentages were 19 and 18, respectively.

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There seems no reason for believing that the extension of this study to the 34 other States would indicate a much wider range of conditions or that the results from the additional States would materially change the general conclusions that may be drawn from the data presented. On the average, slightly more than 30 per cent of the rent which the farm owner receives, and from which he has deducted all the legitimate charges except taxes, must be used to pay the tax bill.

Personal Ability to Pay

Relationship between the taxes and the income of property does not tell all that one needs to know about the burden of taxation. Taxes are levied on property but they are paid by persons. A full understanding of the problem would necessarily include consideration of personal ability to pay taxes as well as the ability of property income to bear such taxes. The two may differ, although in the case of farm property and its owners there is undoubtedly less difference than in the cases of most other types of property and their owners. Benefits from taxation need to be considered before the tax burden can be fully measured. Farm property and farm persons almost universally receive less benefits than do their urban counterparts. There are other qualifications of the method used to measure tax burden, but they would not materially alter the conclusion that income from real estate, and in particular from farm real estate, bears a tax burden that is relatively much heavier than that borne by income in general.

WHITNEY COOMBS,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

TEA Not a Reliable Source of Vitamin C, Nutrition Tests Show

Recently Japan green tea has been exploited by advertisers as a source of vitamin C. It is a well-known fact that the green leaves of many plants are excellent sources of this vitamin, and no great amount of imagination was required to conceive the idea that the leaves of the tea plant might contain this important food factor. Furthermore, this idea was all the more attractive because we are accustomed to thinking of tea as a beverage of social and psychological importance but of very little nutritional value. Even though the fresh green tea leaves contained vitamin C, there still would be the possibility that this factor might be destroyed when the leaves are dried or when the tea infusion is made.

Tests on Vitamin Content of Tea

During the last year experiments to determine the vitamin C content of tea as it is ordinarily drunk have been carried out in the Bureau of Home Economics in cooperation with the Food, Drug, and Insecticide Administration.

Vitamin C is necessary in the diet of most animals, and if it is absent scurvy will develop. Therefore the presence of vitamin C in any food is detected by feeding this food as the sole source of this vitamin in the diet and noting whether the symptoms of scurvy develop. If scurvy does not develop it may be assumed that the food being tested fur-

nishes vitamin C, whereas if scurvy does develop we are justified in assuming that there is no vitamin C in the diet. Such tests are reliable only when they are carried out under carefully controlled conditions on large numbers of animals.

FIGURE 178.—Guinea pig fed orange juice as the sole source of vitamin C in the diet

In the present investigation 49 guinea pigs were used and four samples of tea were examined. A tea infusion made according to the standard method was given to the guinea pigs, and control animals were given orange juice—a food known to be rich in vitamin C. The results of these experiments showed that about one-fourth teaspoon of orange juice each day is enough to furnish all of the vitamin C needed by a growing guinea pig, but seven and eight times this amount of tea infusion failed to prevent the development of scurvy. In fact, only one sample supplied enough vitamin C to enable the animals receiving it to live the entire 90 days of the experiment. Even then they showed severe signs of scurvy at autopsy, which was proof that the amount of vitamin C present was of no practical significance.

FIGURE 179.—Guinea pig fed tea infusion as the sole source of vitamin C in the diet

Figure 178 shows a guinea pig that grew well on a daily allowance of one-fourth teaspoon of orange juice as the only source of vitamin C. This guinea pig is of normal weight and is healthy and alert. In contrast to this is the emaciated and scorbutic condition of the guinea pig shown in Figure 179 which was given about 2½ teaspoons of tea infusion daily as the only source of vitamin C.

There can be no doubt that green tea is a poor and unreliable source of vitamin C even when consumed in relatively large quantities.

HAZEL E. MUNSELL,
Senior Nutrition Chemist, Bureau of Home Economics.

TICK Eradication Is Making Rapid Gain in Florida The whole coastal-plain region is watching with interest the fight being waged in Florida to eliminate the cattle-fever tick, for it is in Florida that this disease-spreading parasite is making its last stand on the Atlantic coast, and cattle owners will not feel entirely safe until the danger of reinfestation is removed.

The cattle-fever tick, like many other parasites injurious to agriculture, is an invader from overseas. In all probability this parasite was introduced into Florida by importations of ticky cattle during the early Spanish colonization of this territory. It is generally conceded that the tick spread throughout the South from this region until an area approximately the same as the Cotton Belt of the South became infested. Climatic conditions in this area permitted the propagation of ticks, while further north they could not survive the winter cold.

There were 15 States in whole or in part originally infested and in quarantine, and although Florida was possibly the first State to feel the stigma of the fever tick she has been among the last to undertake its eradication.

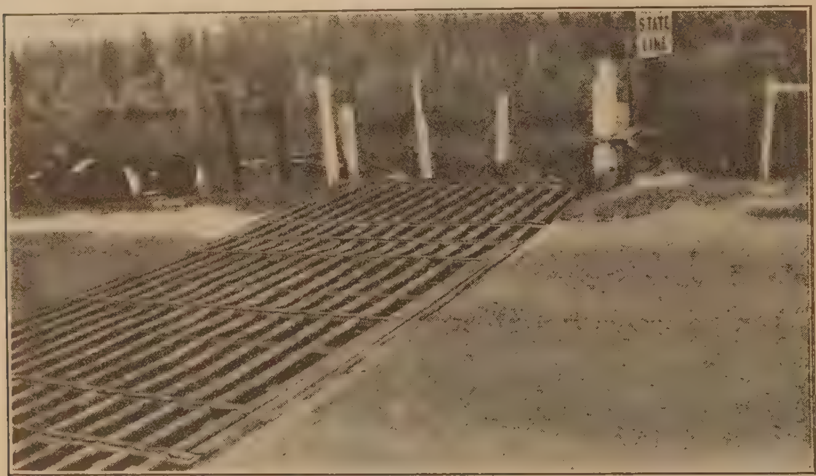

FIGURE 180.—A cattle guard at Georgia-Florida State line. Note double fence which has enabled Georgia to prevent reinfestation of her border counties from tick-infested territory in Florida

Northern Markets Closed Against Ticky Cattle

When the cattle owners of the South and others interested in the cattle industry there saw the markets in the tick-free areas closed against them and realized that southern cattle were not wanted there and elsewhere, they decided to eradicate the ticks.

Climatic conditions in Florida permit systematic dipping at practically all seasons of the year, but many cattlemen in Florida contended that their open ranges covered with palmetto scrub, swamps, and dense forests could not be made tick free because they believed all cattle could not be systematically dipped every 14 days.

Georgia, although under similar topographical difficulties, accomplished tick eradication and in order to remain tick free, imposed an embargo against Florida ticky cattle. This action controlled shipments, but the State line between Georgia and Florida was largely unfenced piney woods, and Florida cattle ranged into Georgia, causing reinfestation along the border counties. Thus it became necessary, in the enforcement of this quarantine, for Georgia to take further steps. To prevent Georgia cattle from drifting into tick-infested Florida and returning infested, and to stop Florida cattle from roaming across the State line into Georgia, Georgia constructed cattle-proof fences along her southern boundary. (Fig. 180.)

Barred from Georgia and Alabama on the north, and surrounded by water on the other sides, Florida found herself without an adequate market for her cattle. Her ranges soon became overstocked with tick-infested cattle, and she realized that something had to be done to enable the cattle owners to dispose of their surplus stock. In 1923 the State legislature, in response to a stimulated interest in tick eradication, enacted a practical law based on the experience of other States and provided funds to carry out the work of tick eradication in cooperation with the Bureau of Animal Industry, United States Department of Agriculture.

Prior to this legislation four counties in the southern part of the peninsula had eliminated the tick largely by voluntary action on the part of progressive dairymen and had introduced cattle of the better breeds, establishing a dairy industry creditable to any State. With this example to prove to cattle owners the value of tick eradication and a good law, providing funds and dividing the State into zones to complete the work, the State and Federal Governments, in cooperation with the cattlemen, organized their forces for the campaign against the tick. The work is now in progress.

Cattle Are Being Improved

In Florida the beef and dairy industries are becoming more alert to the many advantages of the introduction of purebred sires. In the area first freed of the tick, contiguous to Miami and Palm Beach, as fine dairy herds as may be found elsewhere in the country have been established, proving that this southern region is admirably adapted for improved livestock.

FIGURE 181.—Florida scrub cows with first-cross calves of beef breeding

In northern Florida, where the tick has been eradicated more recently, there is an almost constant influx of purebred bulls. (Fig. 181.) From Pensacola in the extreme western part one can drive eastward for 350 miles almost to Jacksonville, remaining wholly within a tick-free portion of the State. Cattlemen in every county in this area are awakened to the potential advantages of a profitable cattle industry. At present, this vast area is primarily a beef-cattle section and hundreds of purebred beef bulls have been introduced, but only a start has been made. Both Federal and State agencies are rendering assistance in this livestock-improvement work. The climate is favorable for growing livestock without expensive shelter; soils and topography are suitable; climate and rainfall are almost ideal. Luxuriant pasturage can be established by seeding to pasture grasses, many of which thrive abundantly. Carpet grass, Lespedeza, and other excellent grasses are

indigenous to the soil where the custom of burning woods and pasture is abandoned. Unlike some of the western ranges, good natural water facilities are nearly always available.

Promising Fields for Dairy Development

The close proximity of Florida to northern and eastern markets affords a ready market for livestock at all seasons, and with approximately $25,000,000 worth of dairy products brought into the States annually, a great field has been opened for dairying in the area free of ticks. By improving the quality of beef cattle in parts of Florida recently made tick free, a vast area is opened up from which northern and western feeders may obtain suitable cattle for feeding and grazing purposes. Breeders of purebred cattle have found in the same parts of Florida a ready market for their breeding cattle, particularly bulls.

The last few years have wrought far-reaching changes in Florida's tick-eradication program. At first there was considerable opposition by misguided persons, but more recently there has been a phenomenal growth in public favor and appreciation of the work. At the close of the calendar year 1929 Florida was over 44 per cent tick free, with systematic eradication in progress in an additional 8 per cent. In addition, five counties were building dipping vats and making the necessary arrangements to start work in the spring of 1930. The cattle-fever tick can not be regarded as a permanent foe to the cattle industry in Florida. The work of tick eradication will gain impetus as more counties are freed from tick infestation, until the whole State will be tick free, paving the way for more and better cattle without quarantine restrictions.

T. W. Cole,
Associate Veterinarian, Bureau of Animal Industry.

TIMBER and Cattle Can Be Raised Together on Southern Cut-Over Land

It is generally estimated that there are in the coastal-plain belt of the Southern States at least 25,000,000 acres of idle lands, which were at one time covered with magnificant forests. That they are not now producing another crop of timber can be laid to destructive lumbering and widespread occurrence of fire. In recent years a few landowners have taken an interest in growing new crops of timber on their cut-over lands and some are considering the possibilities of combining cattle raising with reforestation. Whether this will be feasible or not is being worked out in an experiment that has been in progress since 1923 at the coastal plain experiment station at McNeill, Miss., and carried on jointly by the Southern Forest Experiment Station of the Forest Service, the Bureau of Animal Industry, and the Bureau of Plant Industry.

A tract of 320 acres in Pearl River County, Miss., was fenced in 1923, on land from which the original longleaf pine had been logged about 1902 or 1903. Between the time of logging and fencing the land was open to grazing by both cattle and hogs and the dead grass was burned off nearly every winter. The fenced tract was divided into two 160-acre plots. One of these has been burned over each year since 1923, during the winter time, while the other 160-acre plot has been protected from fire. In each of these two larger plots a 10-acre check plot

has been fenced against grazing. (Fig. 182.) On the 300 acres, cattle grazing has been permitted during the spring and summer (April 15 to November 15 approximately) at the rate of 10 acres per steer. This arrangement has resulted in four distinct conditions: (1) One area grazed and burned (150 acres); (2) one area grazed but not burned (150 acres); (3) one area burned but not grazed (10 acres); and (4) one area neither burned nor grazed (10 acres).

FIGURE 182. The area at the left is protected from both fire and grazing, while the one at the right is protected from grazing but is burned over annually according to local practice

In each of these areas small plots were measured off and staked out for an intensive study of the seedlings of longleaf pine which came up. These seedlings were counted and mapped before and after burning.

Early in 1928 it was found that on the plot protected from both grazing and burning, 82 per cent of the seed crop of 1924 had survived. It seems reasonable to believe that these 3-year-old seedlings—about 13,000 to the acre—will show little mortality from now on. On the ungrazed plot which was burned every year, only 17 per cent of the original 1924 seed crop had survived. On the unburned and grazed plot 70 per cent of the original stand survived. On the burned and grazed plot only 24 per cent of the seedlings were alive. (Fig. 183.) It seems, therefore, that the damage caused by grazing itself has been

FIGURE 183.—The area to the left of the fence includes the experimental plots and is protected by a fire line on the outside of the fence. Land to the right of the fence is an example of burned and cut-over land

relatively slight. On areas protected from fire, the grazing accounted for a reduction of only 12 per cent in the number of seedlings.

Experiment Applies Only to Native Grasses

Thus far the experiment seems to indicate that cattle grazing and timber growing can be practiced on the same land, particularly where fires are prevented. It should be mentioned, however, that these results apply only to native grasslands where the predominating forage grasses are broom grass (*Andropogon scoparius*) and wire grass (*A. tener*). On improved pasture grasses such as carpet grass (*Axonopus* sp.) practically all longleaf seedlings are killed by the close grazing which ordinarily results. It was found that an average of only 1,000 out of 107,000 longleaf seedlings per acre survived grazing on carpet-grass areas over a period of two years.

Preliminary conclusions drawn from this experiment indicate that cut-over pine lands with an ample stocking of seed trees (about 12 per acre) will restock naturally to longleaf pine when given protection from fire and hogs. Until the trees are of merchantable size the same land can be profitably utilized for grazing by cattle, provided of course that injury due to overgrazing is guarded against. It is believed that the optimum stocking to cattle on such areas will approximate one head to 7½ acres of reforesting land.

L. J. Pessin,
Associate Forest Ecologist, Forest Service.

TIMBER Waste Large in the Northwestern Douglas-Fir Forests The Forest Service completed in 1929 a survey in the Douglas-fir region of western Oregon and Washington to ascertain the quantity and character of wood waste annually left after logging. There is probably more unutilized wood left per acre in this region, excepting possibly the redwood belt of California, than in any other lumbering section. (Fig. 184.) The survey showed that the annual accumulation of material of cordwood size and larger now being left unused after logging amounts to 3,088,748,000 feet log scale or 6,177,496 cords of sound wood. In footage this is equal to almost one-tenth of all the lumber annually produced from timber native to the United States.

In 1926 the total pulpwood cut in the United States was 5,489,517 cords. More than one-third of the wood waste left after logging in this region—1,146,276,000 feet or 2,292,252 cords—is western hemlock (fig. 185), Sitka spruce, and true firs, woods in demand for sulphite and mechanical paper pulp. The remainder is Douglas fir, western red cedar, and other species with high lumber values but low pulping properties at present. More than half of all the logging waste—1,626,547,000 feet—is Douglas fir. (Fig. 186.)

Material Listed as to Size

The survey listed the material, as to its size, character and species, into saw logs, excessively high stumps, pulpwood, fuel wood, shingle bolts, poles, and fence posts. From the saw logs, as a rule compara-

tively small or short but such as in other regions would usually go into lumber, it was found that about 1,483,526,000 board feet of lumber could be manufactured. The excessively high stumps, if added to the butt logs of the trees when they were cut, would saw out 231,563,000

FIGURE 184.—Young timber knocked down and left by loggers. In most other regions timber of this size is merchantable. In the Douglas-fir region small logs can not be handled profitably with the huge logging machinery which is commonly used

board feet. The pulpwood from material too small or unsuitable for saw logs would make 755,506 cords (pulping species only). The total annual timber volume used by the paper-pulp mills of the region is calculated at about 484,000 cords. On the basis of the census figures for 1926, most of the pulp turned out on the Pacific coast is from western hemlock, Sitka spruce, and true firs. A little Douglas fir is used. If economical processes for making suitable kraft and white paper from Douglas fir should be perfected, more of this species would be used by pulp mills, and a great deal of Douglas-fir logging waste too small or unsuitable for saw logs would be available for pulp making. This material, listed by the survey as fuel wood, amounted to 1,674,102 cords.

FIGURE 185.—Four examples of western hemlock. A large-sized top in the foreground; a broken log; a stump that is cut too high; and standing trees of small size. All will be burned by the slash fires which are set at seasonable periods after logging as a precautionary measure

Most of the western red cedar logging waste was listed as shingle bolts, telephone poles, and fence posts. There was enough to make each year 4,914,103 shingle bolts (nearly 1,000,000,000 shingles), 176,000 telephone poles, and 7,589,429 fence posts.

The survey developed the fact that as a general average 21,407 board feet per acre of sound material, cordwood size and larger, is left on the ground as logging waste. This is equal to almost one-fifth of

FIGURE 186.—Douglas fir logs, broken and left in the woods. Broken logs in number and volume make up the greatest amount of the logging waste. Note the fine log in the center of the picture, which was broken by felling a tree across it

the original stand of timber. In many parts of the world a forest averaging 21,000 board feet, or 42 cords, of wood per acre would be considered a very heavy stand of timber.

A. H. HODGSON,
Forest Examiner, Forest Service.

TOBACCO Diseases Are Largely Controllable by Sanitary Measures Diseases of tobacco annually exact a heavy toll from the potential profits of the growers and not infrequently cause practical crop failures. During the last decade, in particular, tobacco diseases have become much better understood than formerly, and it should now be recognized that much of the loss caused by them is preventable. In many cases merely the exercise of some precautionary measures may suffice to hold the disease in check. The adoption of sanitary measures of control is destined to become one of the regular and important practices in tobacco culture. It is naturally essential to success in control practices that the measures be applied at the time when the parasite is most vulnerable to attack, and this time is usually before the sowing of the seed or the planting of the crop.

FIGURE 187.—The production of disease-free plants such as these should be a primary consideration with tobacco growers. The presence of leaf spots of wildfire or black fire may result in a badly rusted crop in the field

The production of healthy tobacco plants for transplanting should be the first concern of the grower. Early vigorously growing plants are not necessarily healthy. They may, in fact, harbor a disease which may finally ruin crop prospects in the field. Several of the most serious field diseases of tobacco originate in the plant beds, often on plants that do not appear to be seriously affected. These diseases not only endanger the crop planted from such beds but may serve to start a center of infection in the soil with the setting of each plant and in consequence result in infection of succeeding crops.

Seed-Bed Sanitation

Recently attention has been attracted to the importance of tobacco seed-bed sanitation, because some of the most serious rust diseases of tobacco, especially wildfire and black fire, invariably originate in the plant beds. Their control is almost entirely dependent upon the adoption of sanitary measures in the preparation and management of plant

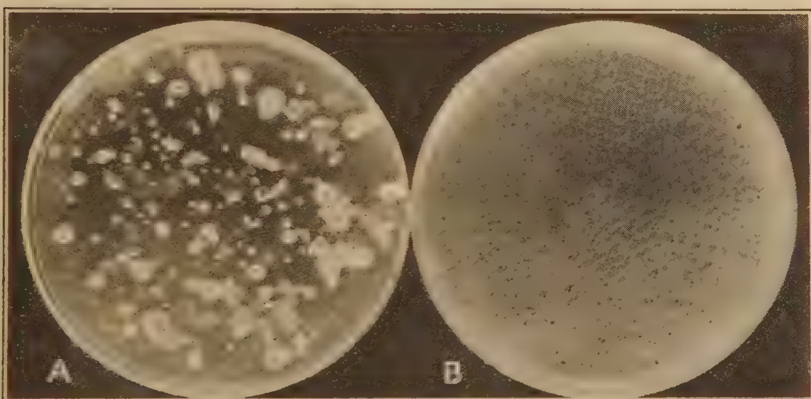

FIGURE 188.—Tobacco seed may harbor parasites, as is shown by the white growth around the seeds in A. Such seed can be thoroughly disinfected, as is shown by the germinating seeds in B

beds. But a number of other maladies may originate in the seed beds as well as in the field. Among these are such well-known diseases as mosaic, black root rot, root knot or the nematode disease, and black shank. The tobacco seed bed may consequently be a veritable base of dissemination for all sorts of diseases and the transplanting of plants from seed beds showing signs of disease should naturally be done with caution if done at all.

Infections in the seed beds may arise from a number of different sources, and every practicable precaution should be taken to prevent the introduction of parasites into the beds. First of all, the location of the plant beds must be considered with respect to the danger of infection from infested soil or from surroundings such as adjacent buildings harboring infested refuse from preceding crops. Refuse from cured rusted crops in particular should be carefully raked up and disposed of by burning or burying. The field refuse and stubble from such crops should be plowed under as soon as feasible. Naturally, no tobacco refuse of any kind should be used on seed beds for fertilizer, insecticidal, or other purposes. Seed-bed frames, sash, or cloth should not be stored in curing barns. If such equipment has previously covered

infected plant beds, it should be either discarded or disinfected with heat or corrosive sublimate before use.

Method of Disinfecting Seed

Black fire and wildfire may also be introduced in the seed bed through infested seed which has been grown in affected fields. If such seed is to be used, it should be disinfected by treating for 5 to 10 minutes with a silver-nitrate solution (1 part silver nitrate to 1,000 parts water), followed by rinsing in pure water. It seems likely that seed disinfection may become a standard practice in the near future, since this simple and cheap procedure, together with the precautionary measures suggested above, will aid in insuring the crop against damage from wildfire and black fire.

FIGURE 189.—When wildfire-contaminated seed is sown, plants may die down in seed beds as shown in A. The same seed disinfected with silver nitrate will yield plants as shown in B

Sterilization of the soil by steam, already generally adopted in some tobacco districts, is a sanitary measure of considerable value in the prevention of such diseases as are commonly harbored over winter in the soil. To be of real value, the process should be properly done both with respect to the condition of the soil at the time of steaming and the length of time of steaming.

Various other precautionary and sanitary measures applicable to field conditions as well might be suggested, such as avoiding infested soils and checking unnecessary spread of disease in the fields by the workers. Some broader aspects of the question present themselves, however, which are more difficult to handle. These relate to the danger of dissemination of serious diseases throughout an entire community or district through the indiscriminate planting and transporting of diseased plants from farm to farm. Here are problems involving sanitation, and possibly even quarantine, well worthy of

the most serious consideration of those who have the welfare of the industry at heart. At present it seems only feasible to advise growers to refrain from planting such plants or from using such other insanitary methods as may jeopardize not only their own crop prospects but those of others in the community as well.

JAMES JOHNSON,
Agent, Tobacco-Disease Investigations,
Bureau of Plant Industry.

TOBACCO Grading Cuts Handling Costs and Gives Trade Confidence A predominant portion, 86 per cent, of the tobacco consumed annually in the manufacture of cigarette, chewing, and smoking tobacco is sold directly by the farmer to the manufacturer at auction warehouses, located at large or small cities in the tobacco-producing areas from the banks of the Ohio River southward. Cigar tobacco is not sold at auction.

The auction method of selling tobacco possesses certain advantages, but likewise certain defects are apparent, and efforts to eradicate those defects have led to a new development in tobacco marketing.

Each of the large tobacco manufacturers has his own grading system developed according to the needs of his own business and has his own series of private grade marks. No two systems are alike. Each manufacturer instructs his buyers the grades to buy and the average price to pay. The transactions are made on the basis of the buyer's private judgment of grade, arrived at from an extremely brief inspection of each pile of tobacco. The farmer does not know the different grade systems, the distinction between grades, or the grade basis for the price he receives. Therein lies his disadvantage. Lacking expert knowledge of tobacco classing, he must sell to expert tobacco buyers whose grades are guarded secrets.

Various circumstances, which have no direct relation to broad economic considerations, influence the prices that buyers pay to growers for their tobacco. One of these is the cost of rehandling to achieve uniformity of grade. In the case of both manufacturer and dealer the tobacco received from the farmer is reassorted for quality, color, length, etc. The cost of this rehandling varies according to the expertness of the grower in assorting his crop.

Uncertainty as to Uniformity

Another thing that works against the farmer is the buyer's uncertainty as to the uniformity of the quality of the tobacco. The tobacco is arranged in piles on the auction floor (fig. 190), and these piles are sold at a rate varying from 150 to more than 300 per hour. As a rule farmers strive for uniformity, but because they often do not know grade distinctions there may be a mixture as to quality, color, and length. In some cases the piles show the human tendency to place the best tobacco on top to catch the eye of the buyer. Occasionally the interior and base of the pile are composed of low-grade tobacco entirely concealed by better grades of leaf. This practice is known as nesting. The fear of nested tobacco frequently operates to depress prices.

A third circumstance enters into the price—the light conditions in auction warehouses. These warehouses are very large and are lighted by skylights placed at intervals over their low, nearly flat roofs. Since color is an important factor in judging the quality of tobacco, the light that falls upon individual piles exerts a strong influence upon the prices bid.

These, then, are three important factors: (1) Expense of rehandling poorly sorted tobacco, (2) uncertainty as to the proportion in which different grades are present in a mixed pile, and (3) varying light conditions.

The influence of the third factor is rather uncertain. It may cause one pile to sell higher than a near-by pile of better tobacco, or lower than an adjacent pile of poorer tobacco; it may cause tobacco to sell higher or lower than its real value. The net effect of all three factors

FIGURE 190.—Scene in an auction warehouse, showing tobacco arranged in piles ready for sale. Each pile bears a ticket similar in form to that shown in Figure 191. Approximately five seconds suffices for the sale of a single pile

is to broaden unduly the range of prices, to introduce a lack of stability in prices paid for tobacco comparable in quality, and to create strong dissatisfaction among growers. This dissatisfaction is difficult to deal with, especially in the absence of any universal language for, or authoritative determination of, quality by which the warehouseman can reply to farmers' complaints.

Grading Service Meets the Situation

The grading service, operated jointly by Federal and State agencies, fits into this whole situation with noteworthy results. By it a language of quality is supplied and a measuring rod for the determination of quality is provided—disinterested, unbiased, and sponsored by the Government.

Among its effects it (1) reduces the rehandling costs to dealers and manufacturers, (2) reduces the mixing of grades and therefore the

buyers' uncertainty arising therefrom, and (3) reduces inequalities of price arising from varying conditions of light.

The services of the federally licensed tobacco graders are available to farmers at a nominal fee at those markets where the service has been inaugurated. The grader goes upon the floor as soon as light conditions are suitable, carefully examines the tobacco, and indicates on the sales ticket the official standard grade. (Fig. 191.) In making his examination of the tobacco, he takes samples from various portions of the pile, and much more time is given to the inspection than is available to buyers under the pressure of rapid sales. Also, as far as possible, all tobacco is examined under similar light conditions.

When the sale of a pile of graded tobacco is opened, the official grade is announced. The first use made of this information is by the warehouseman or his starter, who customarily makes the opening bid on each pile of tobacco. A reference to the grade and to the average price at which the grade has been selling, posted in the warehouse, gives him an excellent basis.

The buyers find the official grade mark of mimediate value in checking their judgment of quality. The benefits are shown in various ways. Buyers may or may not find that their first judgment is in error; the fear of nested tobacco disappears; they can be more certain of the average grade of the pile and can bid with greater assurance.

Grading Reduces Rejections

Next is the grower. His tobacco has been sold; the question arises whether the price is acceptable. As soon as the auctioneer knocks down a pile to the highest bidder, the name of the buyer and the price per pound are entered on the ticket. The grower consults this ticket and the record of previous sales posted on the wall to see whether his tobacco brought a price reasonably well in line with the average price for that grade. If it did, he is usually satisfied that he has received a reasonable price. If his price is materially less than the average for his grade of tobacco, then the grower has an effective basis for rejecting the sale and demanding a new one. Partly because of the greater stability of prices for graded tobacco, and partly because of the more intelligent basis provided for analyzing results of sales, it has been demonstrated that the number of rejections is greatly reduced, and that unwise rejections are practically eliminated.

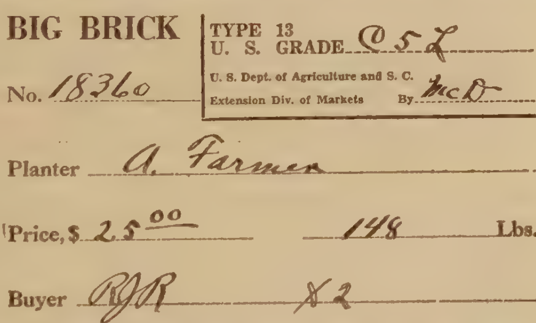
BIG BRICK
No. 18360
TYPE 13
U. S. GRADE C5L
U. S. Dept. of Agriculture and S. C. Extension Div. of Markets By McD
Planter A. Farmer
Price, $ 25.00 148 Lbs.
Buyer RJR X2

FIGURE 191.—A sales ticket such as is affixed to a pile of tobacco on the auction warehouse floor. The entries, which are purely fictitious, indicate that the tobacco was delivered by A. Farmer, was graded C5L and sold to R. J. R. at $25 per hundredweight. The number, 18360, is used to identify that particular transaction in the warehouse records, and the X2, in the lower right-hand corner shows how a buyer might indicate his private grade

No phase of the tobacco-grading service is more important than its educational value in teaching the growers how best to handle their product so as to command better prices. Graders find themselves

surrounded by farmers who want to know the distinctions between grades. No better opportunity could be afforded for a practical demonstration of improved methods of sorting, and the fact that the grader is entirely disinterested and is backed by the Federal Government gives him prestige, and makes his friendly suggestions authoritative and acceptable. Results soon become apparent in closer sorting and in the tendency toward greater uniformity of quality. This is the feature of the service that appeals most to the dealer and manufacturer.

The tobacco-grading service is young. It began at Lynchburg, Va., in 1927, made possible by the cooperation of the Virginia Department of Agriculture and Immigration. It had two years' trial at that place. The first appropriation by Congress for the project became available July 1, 1929, and operations have been expanded to selected markets in South Carolina, North Carolina, Virginia, Kentucky, and Tennessee. It is still a new line of work, but the indications are that expansion will come as rapidly as the technic of grading on a large scale and the selection and training of personnél can be accomplished.

Charles E. Gage,
Senior Crop and Livestock Estimator,
Bureau of Agricultural Economics.

TOBACCO Growers Gain by Acting on a Farm Reorganization Study Dark-tobacco farmers in south-central Virginia who adjusted their farming systems in accordance with the findings of a farm organization study increased their earnings, on an average, from $773 in 1922, to $1,158 in 1927. This was an increase of nearly 50 per cent. The increased earnings in 1927 were made in spite of the fact that tobacco prices were about 50 per cent lower than in 1922, a year as favorable as 1927 for crop production.

In contrast to this improvement in earnings are the results on other farms where no change in the farming system has been made since 1922. On these latter farms, assuming yields and prices for tobacco and for other farm products equal to the average for the State, it was estimated that operator's earnings, due to the decline in tobacco prices, would be about $150 in 1927 as compared with more than $800 in 1922.

Farmers who made changes in their farming systems in accordance with the suggestions given have added livestock enterprises for income, increased their feed production somewhat, and have decreased their tobacco acreage. Under the new system there has been an increase in the yield of tobacco and an improvement in its quality. The average yield of tobacco on these farms was about 750 pounds per acre in 1922 and about 900 pounds per acre in 1927. Tobacco produced on these farms in 1922 brought about the same as the average price for the State whereas in 1927 it sold for about 40 per cent more than the average. This improvement in yield and quality resulted from the use of more lime on tobacco land, from growing more legumes, and from the manure from the additional livestock.

Further Improvement Possible

In the development of livestock enterprises for income, several years are required before maximum returns can be realized. Consequently, in 1927 on most of the farms livestock enterprises had not been devel-

oped to the point at which maximum returns were being realized. The results in 1927, on the farms that followed the suggestions either partially or completely, are considered highly favorable since all farmers reported increased earnings over 1922. On some farms earnings increased only 10 per cent, whereas on one farm a 70 per cent increase in earnings was reported.

The most profitable change made by dark-tobacco farmers is the expansion of the poultry enterprise. In this section climatic conditions are favorable for poultry, and feed crops such as corn and wheat can be grown to advantage. Important eastern and southern markets are near and can be reached with express shipments.

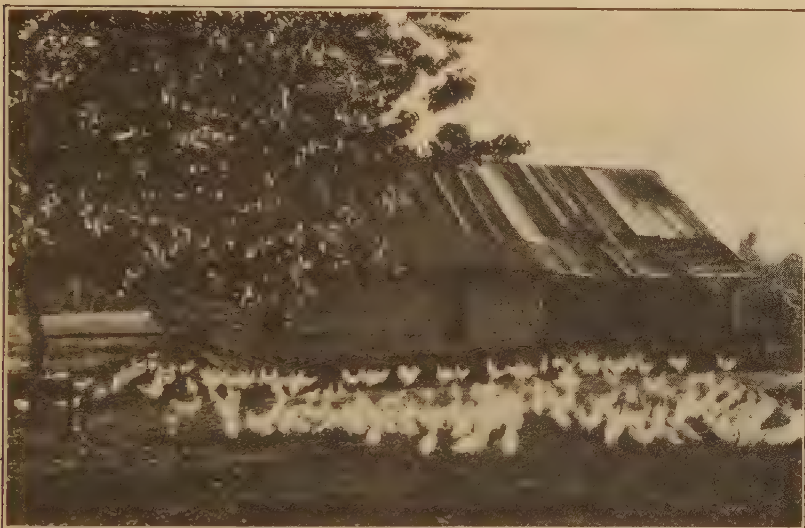

FIGURE 192. This 4-room tenant house was no longer needed for that purpose. It was converted into a brooder house at little expense and is large enough to brood about 1,200 baby chicks

Hog production has been increased with good results on some farms. On farms on which adequate grazing facilities are available, and sufficient feed can be raised for wintering cows, dairying has been found profitable.

In developing livestock production it was usually necessary to adopt methods that would require little additional cash outlay, as most farmers had practically no money for the new enterprise. As a result, they got their start with poultry, either by buying baby chicks or by buying eggs for hatching. Usually there were unused farm buildings that could be remodeled at little cash expense and made suitable for housing poultry. (Fig. 192.)

The project that gave the results on which these suggested changes were based represents an attempt to measure the value of findings of farm management studies for increasing farm profits and is conducted jointly by the Virginia Extension Service and the division of farm management of the Bureau of Agricultural Economics.

Considerable Variation in Earnings

Results from early studies showed a considerable variation in earnings of the different farms surveyed. A detailed analysis of the indi-

vidual farms was made to determine the possibility of making changes which would increase farming profits, and then specific recommendations were made to each of a number of farmers. Consideration was given to the ability of the farmers to carry out the plan suggested, to the adaptability of the farm to the changes recommended, and to the economic outlook of the various enterprises. Most suggestions had to do with developing livestock enterprises for income, with improving the quality of the tobacco crop through soil, improvement, soil selection or better fertilization practices, with soil maintenance through crop rotation and terracing, and with the more extended use of labor-saving devices. In other words, the investigators pointed out what appeared to be practicable methods of increasing farm earnings and showed why past returns had been unfavorable.

FIGURE 193.—The use of more lime, the seeding of more legumes, and manure from the increased livestock kept under the new system have resulted in an improvement in the quality of tobacco and in increased tobacco yields

Immediately after the project was started prices for dark tobacco began declining and have continued at low levels. The decline was largely caused by changing habits on the part of tobacco users and by reduced exports. As a result of low prices for tobacco, farm earnings decreased to the point where some operators were financially unable to carry out the changes suggested. Some farmers did not follow any of the suggestions offered, others followed some of them, still others followed practically all of the suggestions.

Combining one or more livestock enterprises with tobacco farming has already proved profitable to these farmers. The results of these studies should continue to be of value especially to other farmers in the area since the demand for dark fire-cured tobacco probably will continue at relatively low levels.

A. P. BRODELL,
Associate Agricultural Economist,
Bureau of Agricultural Economics.

TURKEY Grading Proves to Be Popular at the Terminal Markets Success of the turkey-grading demonstration conducted by the Bureau of Agricultural Economics for the Christmas market of 1927 led to such a demand for similar grading for the 1928 season that the bureau was unable to comply with many of the requests. Demands for the 1929 season were even greater.

With a limited number of licensed turkey graders in 1928, it was necessary for the bureau to limit the service to the terminal markets where larger supplies were available than at scattered shipping points.

Applications for the service were made by dealers in Portland, Me., in Boston, Springfield, Lynn, Hartford, Providence, New Haven, New York City, Troy, Albany, Baltimore, and Washington, D.C.

Cooperation was obtained from practically all the State marketing officials in the States where the grading was conducted, and turkey-grading schools were held by the bureau in Harrisonburg, Va., Washington, New York, and Boston.

The territory was divided into three sections, with headquarters at Boston, New York, and Washington. A supervising grader from the bureau was stationed at each of these points, and the grading was accomplished under his direction.

FIGURE 194.—In grading turkeys according to Government grades, each turkey is stamped with the grade name on its back. The tag attached to its wing denotes its class

The largest number of turkeys was graded in Boston, where a total of 524,780 pounds was graded. In New York, 484,347 pounds were graded; Washington, 246,747; Baltimore, 150,329; Springfield, 117,430; Providence, 111,074; New Haven, 56,134; Troy and Albany, 35,136; and Portland, 9,675. The total quantity graded at all points amounted to 1,735,652 pounds.

Each bird of the required quality was stamped on the back, with the grade "U. S. Prime," and a tag was attached to a wing which carried a statement regarding the grading and designated the class of the bird, such as "young hen," "hen," "old tom."

A fee at the rate of $2 an hour was charged for the grading work. Total fees paid by the applicants for the grading service amounted to $1,591, of which $118 was received by the cooperating State agencies; the balance was paid into the United States Treasury.

Customers Express Satisfaction

The grading work demonstrated clearly two important facts, both of vital importance to the poultry industry. First, the buying public has confidence in Government-graded products. Ninety-six and three-tenths per cent of the 571 customers who answered a questionnaire

sent to them indicated satisfaction with this method of buying. Many expressed a wish that all classes of poultry be so graded. Second, it demonstrated indirectly the enormous economic losses to turkey producers and packers caused by improper dressing and marketing.

Of the turkeys graded, more than 200,000 pounds were of a quality below U. S. Prime. Much of the inferior quality was caused by carelessness in dressing and packing; much was caused by marketing the birds before they were properly matured; and a considerable part was caused by defects and deformities of the birds due to inferior breeding stock and improper feeding.

To comply with the demand of the country packers and to demonstrate the importance of proper grading to the producer and packer, the bureau graded turkeys in 1929 at country packing plants. Grading schools were held in the West. This work should result in saving a great deal of money to producers and packers, and in eventually placing a turkey of much better finish and higher quality on the consumers' tables.

THOMAS W. HEITZ,
Associate Marketing Specialist,
Bureau of Agricultural Economics.

WARTS of Cattle Are Infectious and Cause Damage to the Hides

Warts are of common occurrence in cattle, particularly in calves. Observations of hides removed in slaughtering establishments indicate that in certain sections of the country from 15 to 25 per cent of young cattle have these growths, especially during the summer. Since warts often

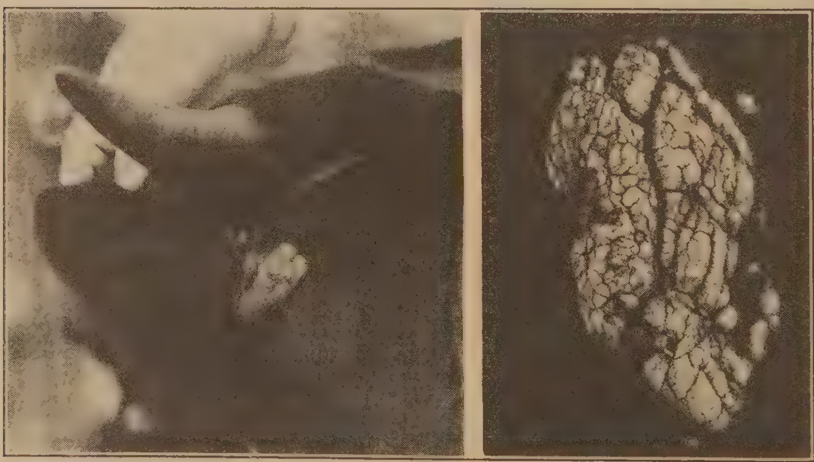

FIGURE 195.—Warts produced by the inoculation of (left) unfiltered and (right) filtered wart material into the skin of calves. Actual sizes of the warty growths were (left) about 2 by 3 inches and (right) about 2 by 4 inches

materially reduce the value of cattle hides, this subject is of considerable economic importance. The number of cattle affected appears to be increasing. Accordingly, a series of experimental studies was undertaken by the writer to learn the cause and other facts concerning common warts in cattle.

These studies consisted in bacteriological examinations of various wart specimens and also in making skin inoculations of cattle with the wart material. Altogether 22 cattle were used, 20 of which were young animals ranging from 5 to 12 months old. Inoculations were made with unfiltered and also with filtered wart material, the latter being the wart extract which had been rendered free from all known living germ life, by passing the extract through a bacteria-retaining filter.

Definite positive results (fig. 195) were obtained in 15 of the 22 cattle used in the experiments. Eight of the calves acquired warts from being inoculated with the unfiltered wart material and seven through inoculations with the wart filtrates.

The results indicate that common warts in cattle can be transmitted experimentally to animals under 1 year of age with a fair degree of regularity. Filtrates of bovine warts, though proved by tests to be free from germs, are capable of producing warty growths when inoculated into the skin of healthy cattle. The warts produced by filtrate inoculations may be transmitted also to other calves. The experiments thus indicate that the cause of common warts in cattle is probably of the nature of a filtrable virus.

GILBERT T. CREECH,
Associate Veterinarian, Bureau of Animal Industry.

WATER Follows Laws Long Ago Expressed in Familiar Sayings The old adages "Water seeks its own level," "Water runs down hill," and "Still waters run deep" have definite application to many puzzling questions that confront a farmer in conveying water about his farm.

Have you ever been disappointed in the flow through a 2-inch pipe, while your neighbor secured an ample supply from one of identical size? Have you ever wanted to pipe water across a ravine but did not try it for fear the water could not climb up the far side? Have you wanted to place a culvert well below the surface of a road to avoid a hump in the road but feared that to lower the culvert would cause it to choke up with mud? Have you ever told anyone that your pump had such capacity that it filled a 12-inch pipe? Have you replaced a 6-inch pipe with a 12-inch pipe when you desired to double the capacity? Have you provided sufficient size and fall for your pipe line or flume, only to find that the water could not get into it fast enough at the intake end? Have you believed that your line would have greater capacity if the water "had a good get-away at the outlet," or argued that the water in an inverted siphon pipe across a depression flows faster down the first slope than it does up the far slope? Have you ever built a small ditch with the same slope as that found satisfactory for a large one and then been disappointed in the velocity and hence in the carrying capacity?

The Basic Principles

A proper understanding of the simple principles involved will enable most farmers to arrive at reasonably proper solutions of many problems in water conveyance, such as those suggested in the foregoing paragraph. The elemental law relating to flow in a pipe line can be expressed as follows:

Water seeks its own level. It will rise as high at the outlet end of the pipe as the water surface at the inlet, but it will not flow after it has reached this condition. The adage uses the word "seeks," indicating that the latter part of the adjustment is quite slow. For usual conditions, all of the pipe line must be lower in elevation than the water surface at the inlet.

Water runs down hill. When water is confined in a pipe, the hill is the imaginary line joining the water surface above the inlet with the water surface above the outlet, or to the outlet end of the pipe when the latter is not submerged. The pipe may be laid up hill and down, provided only that it be kept below the elevation of the water at the inlet, but satisfactory operation will be most certain if it stays below a straight line joining inlet and outlet.

The steeper the hill, the faster the water runs. The height of the imaginary hill in proportion to the length of the pipe is an index of the velocity of water in the line. A fall of 1 foot for each 100 feet of pipe line (measured along the pipe itself) is described as $S=0.01$ or, in words, the slope is 1 in 100.

Still waters run deep. The quantity of water, Q, flowing in a pipe, expressed as cubic-feet per second, is equal to the area of the pipe opening, in square feet, times the velocity of the water, in feet per second, that is, $Q=AV$. If you wish the answer in gallons, then $Q=7.48\ AV$ gallons per second. In one minute there will flow sixty times as much as in one second. Since the same equation holds true for open channels, we can understand why a small stream ripples rapidly through narrow shallow reaches between quiet deeper pools. Since the same quantity of water is flowing through all cross sections, if the area of the section across a deep pool is one hundred times as great as that across the riffles, then the water must flow one hundred times as fast through the riffles as in the pool, and the slower flow is quieter.

Answers to the Stated Problems

By the use of the simple principles given above, the problems stated at the beginning of this article can now be answered.

Your neighbor secured a good flow through his 2-inch pipe and you did not, probably for the reason that he had a steeper slope, that is, more fall in proportion to length of pipe. If your pipe is twice as long as your neighbor's, you will require about twice as much drop in elevation between water surface at intake and water surface at outlet. Thus the fact that a certain size pipe will give a certain yield in one situation is no indication that it will do so in another.

You can cross a ravine with a pipe line, allowing the pipe to follow down the near slope and up the far slope without difficulty, but you must have the outlet of the pipe lower than the inlet. If it is but a little lower, the flow will be but a dribble; to double the flow you will have to increase the fall from inlet to outlet about four times.

You can take the bump out of a road by placing the culvert pipe well below the surface of the road. If the cross-sectional area of the pipe is less than the area of the cross section of the water in the ditch, then the water will speed up to get through the culvert and thus prevent the deposit of silt. The writer has seen many cases where muddy waters filled the open ditches but the road culverts were always clean. However, to provide the fall in the water surface from inlet to outlet of the

culvert, it will be necessary to raise the banks of the ditch upstream from the culvert so that the water will check up a little higher than it did for the old culvert.

When you told someone that your pump could fill a 12-inch pipe, did it occur to you that a pump throwing but half as much water would also fill the same pipe but that the water would be flowing only half as fast? Likewise a pump throwing four times as much water would fill the pipe but the velocity of the water would be four times as great and the friction head at the pump would be nearly sixteen times as great.

When you replaced a 6-inch pipe with a 12-inch pipe to double the flow, you actually increased the capacity about six times. As a matter of fact, an 8-inch pipe will convey about twice the amount of water that a 6-inch pipe of the same length and same fall will carry.

When enough water did not enter the intake of your pipe, even though the fall and the size of pipe were sufficient to carry all the water desired, there was but one thing lacking—the intake was too high. If your pipe was to carry the water at a speed of 8 feet per second, the intake end should be at least 1½ feet below the surface of the water. Of this, 1 foot depth is needed to generate the velocity of the 8 feet per second. The additional one-half foot is necessary to overcome retarding influences around the usual entrance to a pipe line. Much water trouble has been caused because someone forgot or did not know that velocity head must be provided.

Effect of a Submerged Outlet

In regard to the get-away at the outlet of a pipe, the effect of a submerged outlet depends upon the depth of submergence in proportion to the difference in elevation of water surface between inlet and outlet of the pipe. A good get-away does aid the discharge for a short pipe, but for a long pipe, or wherever the depth of water over the outlet is not great compared with the total fall from inlet to outlet, the discharge is not materially reduced for lack of a good get-away.

Where an inverted siphon pipe is the same size throughout its length, the velocity within the pipe is the same at all places where the pipe is full of water.

Water will not flow as fast in a small channel as in a larger one of identical construction and shape, having the same slope or rate of fall. Water in a large canal may flow very satisfactorily on a slope of 1 foot per mile of canal, while to get the same velocity in a small head ditch might require a fall of 1 foot per 1,000 feet of ditch, and in a small field lateral a fall of 2 or 3 feet per 1,000 feet of lateral.

In the scope of this article it is not possible to detail all the possible water problems that may confront a farmer. Some of the more common errors made by farmers who perforce must do much of their own planning and construction have been pointed out. The principles stated above will give a clearer understanding of most water problems, but the solution of the questions in terms of definite quantities of water is a complex matter, and a farmer or organized group of farmers will find that a small amount of money invested in proper engineering advice will pay large dividends in results.

F. C. Scobey,
Senior Irrigation Engineer, Bureau of Public Roads.

WEATHER BUREAU Gets Data on Behavior and Effects of Tornadoes Much statistical material on the occurrence of tornadoes has been collected by the Weather Bureau and other Government agencies at various times during the last 50 or more years. Lack of reporting stations in certain districts where these storms are known to occur, and an early general lack of population over some of the lately developed territories in the tornado area, made it impossible to secure the full facts from certain regions until within comparatively recent years.

The tornado is a local whirlwind of great velocity, generally accompanied by rain, thunder, and lightning. Its almost invariable characteristic is a funnel-shaped cloud that appears to hang from the bottom of a much greater cloud mass above. The wall of the funnel, of 50 to a few hundred feet in diameter, consists of a mass of violently whirling air with strong ascending components. The whole system progresses, in general, from southwest to northeast in a narrow path (a few feet to a quarter mile in width) at a speed of 30 to 40 miles per hour. The length of the path varies from a few miles up to 200 miles or more.

Behavior of Tornadoes

Tornadoes usually occur in the southeast quadrant of an advancing low-pressure area and seem to be formed at the cloud level by the passing of a cold northerly current by a warm current from some southerly direction. At the junction between these winds a whirl may be set up which, descending toward the earth, reaches the ground as a violently rotating wind column of varying dimensions that moves generally in a northeasterly direction, and that frequently causes loss of life and property damage, the extent depending largely on the character of the territory over which it passes.

The most extensive tabulation of tornado statistics appears in a professional paper of the signal service, No. VII, entitled "Character of Six Hundred Tornadoes," by Finley, published in 1884, and containing such information as was obtainable for the period 1794 to 1881.

While the period covered by this investigation was a long one—nearly 100 years—still the facts presented did not represent anything more than general statements of the occurrences of these storms. They afforded no means for correctly interpreting the comparative frequency of tornadoes over different parts of the country, or in the different parts of a State.

The next attempt to gather such statistics on a country-wide basis was made in the Weather Bureau by Henry who gathered and published the details of tornadoes occurring in the period 1889 to 1897, but these data were not representative of all parts of the country, due to the conditions referred to previously, which still existed to some extent even in that period.

In 1916 the Weather Bureau again undertook to collect tornado statistics on a uniform basis for all parts of the country. By that time the areas where these storms are most frequent had become more fully populated and the means of securing details of their occurrences had become widespread. It was felt no important tornado could occur without being reported from some portion of its path.

Beginning with 1916, statistics on all tornadoes that have been reported from any part of the country have appeared in the annual

reports of the Weather Bureau. In addition to narrative accounts of the storms, giving the dates of their occurrence, the direction of their movement, the length and width of their paths, and data on life and property loss, the locations of the storms have been indicated on charts. A separate chart has been presented for each year since that time.

A preliminary discussion of these storms by the methods heretofore followed was made in 1924 by Hunter, but as the method of grouping statistics was still by States, this survey offered no easy method of studying their comparative frequency over the different parts of the country or in different parts of the States affected.

Method of Reckoning by Areas

In this article the facts are graphically presented by dividing the entire country into equal areas of 10,000 square miles each, regardless

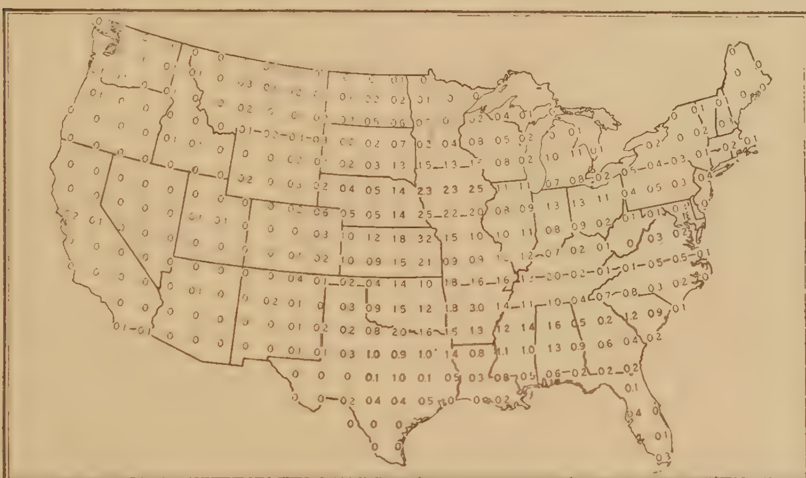

FIGURE 196.—Tornado occurrences in the United States, 1916 to 1928, inclusive. In this chart the country is divided into equal areas of 10,000 square miles each, regardless of State boundaries

of State boundaries, each area being 100 miles square. Within these squares is placed the number per year of tornadoes that occurred within the 13 years of this record. Any tornado having a track within the limits of a certain square was counted as one for that square. Where the track extended into a second square it was likewise counted as one occurring within that square. A long track occasionally passing over two or more squares was counted in each square over which it passed. By combining the counts for each of the 13 years for the same square, the averages for the entire period were found and these were placed in their respective squares in Figure 196.

A study of the chart (fig. 196) shows an area of maximum occurrence of tornadoes over extreme northeastern Kansas, where the average number of these storms for the period was slightly more than three per year. Numbers nearly as high are found in near-by portions of Nebraska, in central Arkansas, and generally over the greater part of Iowa.

Over the less elevated portions of the country between the Rocky and Appalachian Mountains tornadoes are distributed fairly equally. The frequency diminishes westward quite rapidly as the Plains merge into the Rocky Mountains. Tornadoes are much less frequent west than east of those mountains. To the northward over the Great Plains they diminish in frequency and become somewhat rare near the Canadian boundary. In the East they are mainly much less frequent than in similar latitudes of the Mississippi Valley. They are less frequent in the more elevated portions of the Appalachian Mountain region than farther eastward toward the coast. Certain areas in West Virginia were exempt from a visitation during the period under discussion. None occurred in Maine. They diminished toward the Gulf coast, though the evidence indicates that they may occur in all parts of Florida. Tornadoes have not been observed in extreme southern Texas.

The chart indicates the comparative frequency of tornadoes in the different areas of the United States, and the improbability of any important area east of the Rocky Mountains being entirely free from such visitations. However, when the narrowness of their paths is considered (frequently only a few yards or rods) and the fact that their length is often but a few miles, it is evident that the chance of a tornado occurring at any particular point, even in the region frequently struck by tornadoes, within a limited period of time is small.

The chief concern is the fact that tornadoes will occur in the future. Moreover, their destructive effects will continually be augmented, not by increased severity of the storms, but as a result of the growing population and the building of larger factories, schools, or other places where people congregate.

TABLE 20. —*Total number of tornadoes in the United States, by months and years, 1916 to 1928, inclusive*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1916	3	0	1	7	15	38	4	4	2	1	0	11	86
1917	4	0	14	6	50	39	3	1	0	4	0	0	121
1918	3	3	0	18	34	8	1	6	4	1	3	0	81
1919	0	0	15	15	13	3	3	6	4	5	0	1	65
1920	0	2	22	15	13	14	12	2	5	1	0	1	87
1921	0	4	14	39	17	6	4	4	9	1	3	5	106
1922	3	2	26	23	16	9	8	7	4	0	9	1	108
1923	2	0	8	16	27	19	5	10	11	0	2	0	100
1924	1	4	13	28	18	24	14	9	10	1	3	5	130
1925	4	6	10	19	5	38	12	4	4	8	4	5	119
1926	2	4	4	13	13	17	14	11	9	1	23	0	111
1927	0	6	9	41	54	10	13	3	14	9	4	1	164
1928	5	0	7	24	21	71	25	23	13	5	5	4	203
Total	27	31	143	264	296	296	118	90	89	37	56	34	1,481
Average	2.1	2.4	11.0	20.3	22.8	22.8	9.1	6.9	6.8	2.9	4.3	2.6	113.9

The occurrence of tornadoes during the different seasons is shown in Table 20. This table indicates a great excess of occurrences during the late spring and early summer months over those in other months. May and June have the maximum occurrences, and January the least. There is little difference in the frequency of tornadoes during the winter and late autumn. The year having the greatest number of separate occurrences, 203, was 1928; the least, 1919, with 65.

Losses of Life and Property by Tornadoes

Table 21 shows some statistics of the loss of life and the estimated monetary damage to property caused by tornadoes during the period covered. The largest loss of life and property usually occurred when a storm passed over a city or a number of thickly inhabited areas. In 1924, on June 28, great damage occurred in and near Lorain, Ohio, with a loss of nearly 100 lives and property damage amounting to about $12,000,000. In 1925, on March 18, a tornado of unusual length and severity passed from southeastern Missouri across Illinois into Indiana, a distance of more than 200 miles, and caused the death of 689 persons besides property damage amounting to more than $16,000,000. In 1927, on September 29, at and near St. Louis, Mo., 79 lives were lost and property damage estimated at $25,000,000 resulted from a tornado.

TABLE 21.—*Statistics of tornadoes in the United States, by years, 1916 to 1928, inclusive*

Year	Number reported	Aggregate loss of life	Most deaths in a single tornado	Aggregate reported property losses	Number of tornadoes causing losses of—	
					$100,000	$1,000,000
1916	86	140	30	$2,511,500	6	1
1917	121	508	103	15,007,700	22	5
1918	81	134	36	7,631,200	20	1
1919	65	205	59	6,861,500	9	2
1920	87	498	87	15,205,000	24	7
1921	106	202	61	5,406,300	13	1
1922	108	133	16	6,630,000	21	0
1923	100	109	23	2,958,750	9	0
1924	130	376	85	26,120,850	27	4
1925	119	794	689	24,023,900	27	1
1926	111	144	23	4,318,950	17	0
1927	164	540	92	43,445,650	31	7
1928	203	92	14	13,235,600	28	4

Physical Effects of Tornadoes

Instances are recorded where heavy iron beams offering little surface resistance to tornadoes, as compared with the weight to be moved, have been picked up bodily and moved considerable distances. In one case two iron frame cultivators standing side by side in a field were picked up and carried some distance and dropped in different places. One was torn apart and the portions bent, while the other was deposited intact.

On the other hand, marvelous examples are on record where frail objects were moved lightly. A nest with an egg in it was carried away with the wreckage of a barn, but deposited so lightly that the egg was not disturbed. In another case a child was carried some distance by the wind and dropped uninjured, while near by a horse was mangled and killed. A man alone in his home at night did not notice the fact that his house had been lifted from its foundation, and was moving in the air, until his attention was called to the opening of a door. He stepped outside, and fell a considerable distance.

Safety Methods to Be Observed

As tornadoes usually move from west to east, one's first thought, in case of a threatened tornado, should be to move as rapidly as possible

at right angles to the direction in which the storm appears to be moving. Frequently the approach of such a storm may be observed at some distance. A position on the north side of the storm's track is safer than one at an equal distance to the south.

If no means of quick escape offers, safety should be sought in a tornado cellar. Many sections of the country are provided with these safeguards. In their absence the cellar or the basement of a frame house offers the next best chance. It is best to choose the side which the storm is approaching, especially the southwest corner, close to the wall, where, if the house moves or breaks apart, the débris will ordinarily be carried away from this position.

In a brick house, however, the walls may collapse and the cellar prove a death trap instead of a refuge. If there is no protection below the ground level, it is well to pick some depressed location and lie flat, face down, holding onto anything handy.

In schools of one story, the pupils' desks, if strongly fastened to the floor, offer instantly available refuges, under which the pupils may crouch and be shielded, with risk of death or injury greatly lessened, when no better protection is available.

A careful inspection of the storm path of one of the most destructive tornadoes of recent years that passed for more than 200 miles in a nearly straight line from near Annapolis, Mo., across the entire State of Illinois and into Indiana, disappearing about 3 miles southwest of Petersburg, Pike County, Ind., on March 18, 1925, disclosed that steel and reinforced concrete buildings withstood the force of these winds without much damage. It was not possible, however, to state in all cases that these were exposed to the full force of the wind. It appeared also that frame structures strongly braced with sheathing, as if prepared for the placing of a stucco finish, offered much resistance to the winds. All brick structures, as well as ordinary frame buildings in the direct path of the storm, suffered greatly, the brick buildings particularly in their upper portions, though many of the lower walls remained standing. In general, the only structures that escaped material injury were as stated above.

It seems possible to build structures that will stand the force of these winds, but whether the chance of a certain area being struck by a tornado is sufficiently great to justify the increased cost of erection is for the individual to decide. However, it is thought that schools and other public buildings and factories or like structures where large numbers of persons are gathered, should be constructed with a view to being able to withstand the force of the tornado.

P. C. Day,
Climatologist, Weather Bureau.

WEATHER'S Influence on Plant Diseases Important and Frequently Dominant

The weather has been defined as the daily and hourly condition of temperature, humidity, rainfall, and other factors, the sum total of which for a period of years makes up the climate. These changes have a very great effect on plant diseases, often a dominant effect. The most striking and definite effects, of course, are produced by the extreme or unusual conditions.

Plant diseases may be classified as parasitic, virus, and nonparasitic. The parasitic diseases are the direct result of the attacks of parasites, mainly fungi, bacteria, and nematodes. (The direct effects of insect attacks on plants are not ordinarily classed as diseases in the United States.) The virus diseases belong to a special class and might be considered as a group under the parasitic. They are infectious, have definite geographical distribution, and act in many ways like parasitic diseases, but no causal organisms have ever been isolated from them. The nonparasitic diseases form a large and varied group, comprising all types not caused by parasites or by infectious virus. These are due in a general way to environmental conditions and to some extent to disturbances within the plant itself.

Weather conditions, especially the extremes, have a profound effect on all three of these classes of disease, and in the nonparasitic class may be the main or the sole cause.

In each weather factor influencing plants, such, for example, as temperature, sunlight, and precipitation, there is a best condition, an optimum or ideal in which the plant thrives best; also a minimum and a maximum at each of which it is killed and near which it suffers injury. In the zones approaching the maximum and the minimum many types of plant diseases are produced or influenced by the weather. The only other large group of factors of the physical environment of plants which produce disease are those connected with the soil, and the soil itself is profoundly affected by weather conditions. Plants suffer from unfavorable weather in varying degrees. It is only the results of extremes which produce some marked injury or symptom from which they do not recover or recover imperfectly or slowly, that should be classed as disease.

The various weather factors may be outlined as follows: Temperature, precipitation (dew, rain, hail, snow, sleet), relative humidity, sunshine, wind velocity, barometric pressure, and electrical conditions. All these, except possibly the last two, very definitely influence plant diseases.

Sun Scald of Various Types

Among temperature and sunshine injuries or diseases there is sun scald of various types, including winter sun scald of the trunks of trees caused by the nearly horizontal rays of the 3 o'clock sun; summer sun scald, produced by the nearly vertical rays of the noonday sun on the bark of horizontal branches; tip burn and margin scald of leaves; and heat scalding at the ground line of seedling trees and other plants, including seedling pecans. Many plants are sickened by high temperatures. Blossoms may be injured or prevented from setting fruit, without definite lesions or wounds. That winter injury limits the northern range of fruit trees and perennial plants in the North Temperate Zone is generally known. It is less commonly known that high winter temperatures limit the southern range of deciduous fruit trees and many perennial plants. The absence of the winter resting period results in serious physiological disturbances, failure to grow, failure to fruit, or even premature decline and death.

Even less critical temperatures have a profound effect on the parasites and their ability to attack the host plant. High summer temperatures not particularly injurious to the host may have a very definite limiting effect on disease-producing fungi and bacteria. This

limits some of the diseases to the cooler sections of the United States, or to cooler seasons of the year. The reverse conditions obtain with certain fungi, such as apple bitter rot and blotch, which occur well to the southward and thrive only during hot summer weather.

Generally speaking, the fungous diseases are most serious in rainy or moist regions and during periods of excess of moisture, and the physiological or nutritional diseases are more abundant in dry climates or in abnormally dry seasons, but in both cases there are some very definite exceptions. Powdery mildews and rusts are apt to occur abundantly in semiarid regions. Fungous diseases of the roots of plants apparently are just as common in the drier parts of the country, but the average soil moisture, since it is supplied largely by irrigation, is probably about the same as in rainy sections. In districts where the rainfall regularly exceeds the evaporation and water passes downward through the soil, washing out excesses of salts or injurious substances, deficiency diseases are more common. In the drier regions in the western half of the United States, where the rainfall does not equal the evaporation and where soluble materials may accumulate in the soil in dangerous concentration, nutritional diseases due to excess of substances are most abundant.

FIGURE 197.—Apple twigs affected by the apple powdery mildew fungus. Yellow Newtown from California. Photographed in September

Infection Periods in Fungous Diseases

Rain, fogs, and heavy dews constitute important factors in both nonparasitic and parasitic diseases, especially the latter. Most parasitic fungi require definite infection periods, that is, rain with a spell of cloudy weather and high humidity, for their successful attack on the host plant. The apple powdery mildew can germinate on the heavy dew and accompanying fog. (Fig. 197.)

Relative humidity, while often associated with precipitation, is really a different factor. There may be long periods of high relative humidity with light rainfall, or heavy rainfall during short periods with prolonged intervals of low humidity. Plants are keenly sensitive to relative humidity, and so are most of their fungous enemies. As a rule, high humidity is injurious to most crop plants, or perhaps, more accurately, plants suffer from periods of dry, hot sunshine much more seriously when they have been grown in or subjected to long periods of moist, cloudy weather. Yet, in a general way, sunshine counteracts the effects of too much rain and humidity. There is, however, a correct amount, or optimum, of sunlight for each plant, if other factors are normal, and this produces dark-green, vigorous foliage and the

best possible growth. Too much sunlight produces pale-green leaves, small in area, resulting in a disease named "insolation."

Mechanical injuries resulting from snow, hail, and sleet are well known. Certain types of injuries are produced by the smothering with snow and ice. Broad-leaved evergreens may be winter-injured at noncritical temperatures when covered with frozen rain or sleet, and certain fungi attack their host only under snow.

After Effects of Mechanical Injuries

The effect of wind in uprooting trees and plants, breaking branches, splitting forks, and blowing off the fruit is well known. Fungous diseases oftentimes follow mechanical injuries to trunks and branches of trees. Wind accompanied by freezing weather greatly increases the intensity of injury to fruit trees in blossom or young fruit. Furthermore, wind currents are very largely instrumental in distributing spores of fungi. Extremely dry winds on the Pacific slope have resulted in the drying up of the pistils of fruit blossoms, thus preventing the setting of the fruit.

Plants are not especially sensitive to barometric pressure. Experiments have given negative results. Fungous activity during a low barometric period may be laid to the moisture rather than to the actual barometric condition.

Direct injuries and mutilation to trees and even other plants by lightning strokes are well known. Sometimes in vineyards the current runs along the wires to which the vines are attached and kills a large number of the vines.

Parasitic Diseases

In the case of parasitic diseases the weather affects both the host and the parasite. The weather that counts most is that at some critical period, when the plant is starting into growth in the spring, when the leaves or fruits are young and tender, when seedlings are germinating, or when trees or plants are in blossom, and again when fruits and leaves are declining in vigor on approaching maturity. But especially the weather at some particular period in the life history of the fungous parasite may determine the amount of disease for that season.

In general, parasitic fungi reach the leaves, fruits, or stems of plants in the form of spores blown by the wind or carried by insects. These spores have to germinate in a drop of water (rain or dew), and this moisture must be maintained usually for several hours. A rainstorm or perhaps a very gentle misty rain with high relative humidity at this critical time becomes an infection period. With many fungous diseases these infection periods require for their greatest effects that the moisture shall remain on the leaves for an entire 24-hour day, and often this is stretched to 48 hours or more. Heavy, dashing rains are not considered ideal infection periods, whereas light rains with high humidity maintained for a long period appear to furnish the most complete infection periods. Some fungi, like the downy mildew of grape or potato, germinate in a drop of water, and the germ tube must find a stomate to enter; in other cases they bore directly through the cuticle. The spores of some fungi germinate in half an hour.

The cuticle is air-tight and water-tight, and when well developed, one of the most resistant of all plant tissues. The plant is therefore

sealed up against all but its most active parasites. If conditions are sufficiently unfavorable, some of these can penetrate the uninjured cuticle; but storms whip the leaves and branches and break the cuticle, and feeding punctures and egg-depositing injuries are made by many kinds of insects.

Examples of Weather Effects

A few examples may be given of the effect of the weather factors on certain diseases.

Apple scab: The apple-scab fungus thrives best in cool, moist weather. It most readily attacks the tender young leaves and young growing fruits. It is most severe in the northern apple sections, extending southward in the Allegheny Mountains. It has a summer-spore form and an overwintering or mature form. The latter lives on the fallen leaves and requires a resting period of cold weather. In the mild temperatures of midspring it requires rains for actually throwing out its wind-borne spores. Dry springs are distinctly unfavorable both to the infection by the overwinter form and to the distribution and secondary infection by the spring and summer form.

FIGURE 198.—A gall of the common cedar rust with its gelatinous spore masses fully exuded, on the red cedar, ready to transfer to the apple in late April

Apple cedar rust: The cedar-rust fungus, with its complicated life history and dual hosts, is extremely susceptible to rain at certain critical periods. The galls that carry the fungus on the red cedar mature about the time that apples come into blossom. When rain comes they swell out their gelatinous spore masses (fig. 198) and exude millions of tiny secondary spores called sporidia. These are wind borne and must in turn have moisture in which to germinate after they reach the apple leaves. (Fig. 199.) As long as it stays dry, this fungus simply waits. In the spring of 1926 at Washington, D. C., no spores were thrown out from the red cedars until May 15, after fully half the infection season had passed. Few rains occurred between that date and June 10, when the period of spore exuding ends. As a result, only a moderate amount of cedar rust occurred in this vicinity. In 1929 there were frequent rains throughout May and June, and a much larger amount of apple cedar rust. A July and August drought may affect the transfer of the fungus from the apple to the cedar, and on account of the 2-year life cycle, may result in less apple cedar rust the second season.

Brown rot of stone fruits: Brown rot of peaches and other stone fruits is extremely sensitive to moisture, but only moderately so to

temperature. Moisture conditions when peaches, plums, and cherries are in bloom in the spring often result in severe blossom infection. Then again, as the fruits approach maturity they become susceptible to the rot, and the results are often very destructive in the humid eastern United States, especially on plums, peaches, and sweet cherries. In the States of Oregon and Washington, which have winter rains, infection periods for this fungus with sufficient moisture occur mainly in the spring and in the fall.

Pear blight: This is a bacterial disease which is greatly favored by moisture conditions during critical infection periods. For its most active infection there should not be too much rain during the blossoming period, since this interferes with the insect visitors which carry the germs from flower to flower and from tree to tree. It is not killed by cold in the bark of apple trees in the Dakotas but remains dormant during cold weather. In general, however, it is less serious in the northern limit of apple and pear culture and more serious in the Gulf Coast States and in California. The dry, sunny summer weather of California tends to check pear blight and to prevent new infections, but the mild winter weather of that State, with its frequent rains, is extremely favorable to the development of the holdover blight, as well as blossom, twig, and bark infections in early spring.

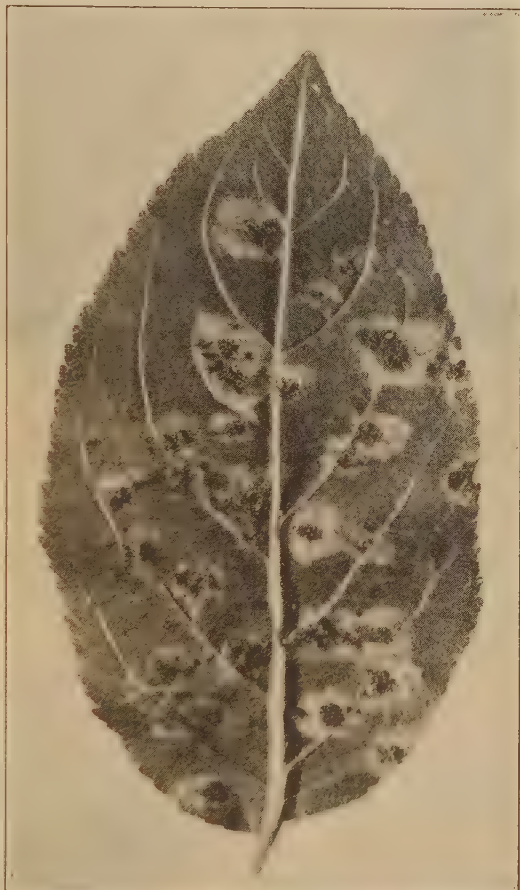

FIGURE 199.—Cedar rust, showing cluster cups, under side of leaf of Maiden Blush apple. From Maryland

Peach leaf curl and the gumming fungus: These fungi (fig. 200) like cool weather and moisture. In both cases the spores fall on the buds and twigs in the summer and autumn, and the fungus grows in winter or early spring. Rains favor and dry weather checks their growth.

Virus Diseases

Among the virus diseases less definite statements can be made about weather influences, with present incomplete knowledge. In

the peach-yellows group the weather appears to have practically no effect on the disease after it once shows in the tree. The trees die according to their regular program within four or five years. Some influence, however, causes enormous variation in the number of new cases that appear in different seasons and in different communities. In some virus diseases the weather conditions affecting the insect vectors are known to have a profound effect on the amount of the disease. In some cases virus diseases of a milder nature are known to be entirely masked temporarily by favorable weather conditions which cause the plant to grow so vigorously that it appears normal.

FIGURE 200.—Peach leaves attacked by the peach leaf curl fungus. Photographed in May

Physiological or Environmental Diseases

In the group of physiological or environmental diseases the extremes of weather conditions may be the direct cause, or, operating with other factors, may be an important part of the cause. Winter injuries (fig. 201) and frost injuries (figs. 202 and 203), scald, and heat injuries have already been mentioned. Winter injuries are by no means always due simply to intense cold, but more commonly to preceding warm spells which have prevented ripening or stimulated the tree into growth and changes of the sap which have made it abnormally susceptible. Frost collar injury to fruit trees may be cited as an example. Exactly the opposite type of injury may occur on the immature twig tips of rose bushes, raspberries, or even of young fruit trees at times.

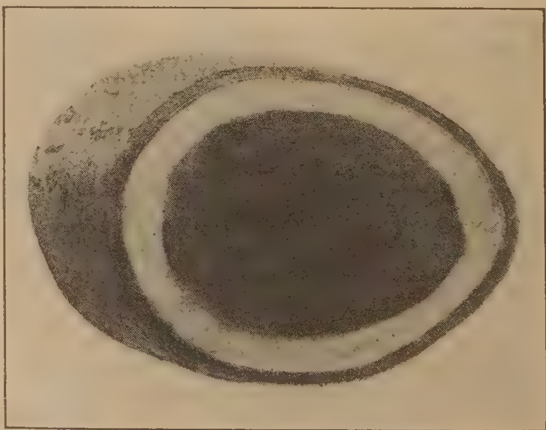

FIGURE 201.—Winter injury in the interior of the trunk of a young Stayman Winesap apple tree, showing the blackened heartwood and one year's growth of new sap wood

Root drowning, which results in the death of the root hairs or the young feeding rootlets, constitutes a very common trouble with fruit trees and other crops. Nitrogen starvation, potash starvation, and even lime or magnesium hunger and similar nutritional troubles are often definitely tied up with excesses of rainfall occurring previous to the development of these symptoms. All plants must have their normal quantity of water, either from rain or from artificial irrigation, and they suffer in varying degrees from drought if water is insufficient; but most plants suffer even more violently and die more quickly from excess of water. With certain plants excess of atmospheric humidity is scarcely less important than soil moisture. In actual practice the two go together. Plants growing with an excess of moisture and an excess of humidity form large, tender, sappy leaves which are ill prepared to stand excessively hot, dry sunshine or drought, and the reverse is also true. After dry weather the leaves can not stand rain. Much of the suffering of plants from moisture relations results from violent changes. While plants need a certain quantity of rain and atmospheric humidity and a certain quantity of moisture in the soil, they suffer seriously from excess of rain. Not only does excessive rainfall affect a plant directly in physiological disturbances, but rains and humidity furnish the infection periods for most of its fungous parasites that produce disease.

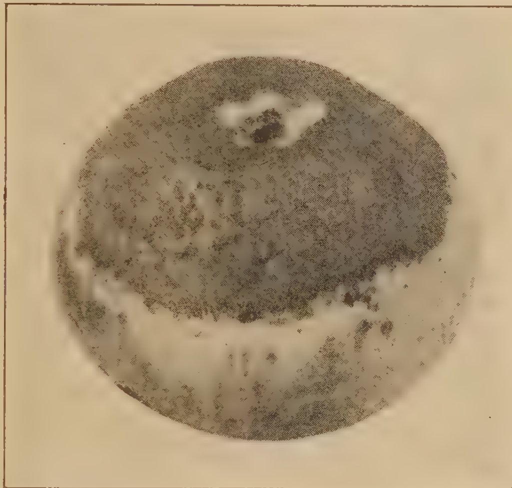

FIGURE 202.—Russet band on apple from frost injury produced at the blossom period. Photographed in August

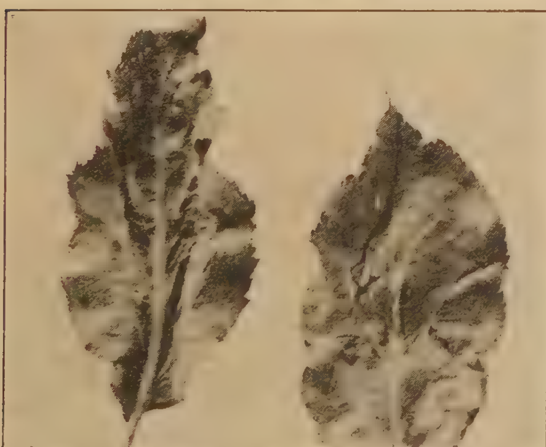

FIGURE 203.—Frost blisters on the under side of apple leaves, the result of April frosts on very young leaves. Photographed in June

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WHEAT-PRICE Analysis Requires Comprehensive World-Market Reports It is commonly said that the world supply determines wheat prices. The contribution of the United States to the world's wheat production is only about one-fourth of the total outside of Russia and China. Consequently the variations in the wheat crops of the United States have a rather limited influence upon prices generally. In 1923, for example, when the United States had a crop of only 797,000,000 bushels, the average farm price in the United States was 92 cents per bushel, whereas, in 1924 a crop of 864,000,000 bushels sold at an average price of $1.28 per bushel. The reason for the difference in the two years is that the world crop of 1924 was 400,000,000 bushels less than that of 1923.

The carry-over of old wheat must also be taken into account. The world wheat crop of 1929 was about 500,000,000 bushels less than the crop of 1928, but the carry-over at the beginning of the season was about 140,000,000 bushels greater than at the beginning of the

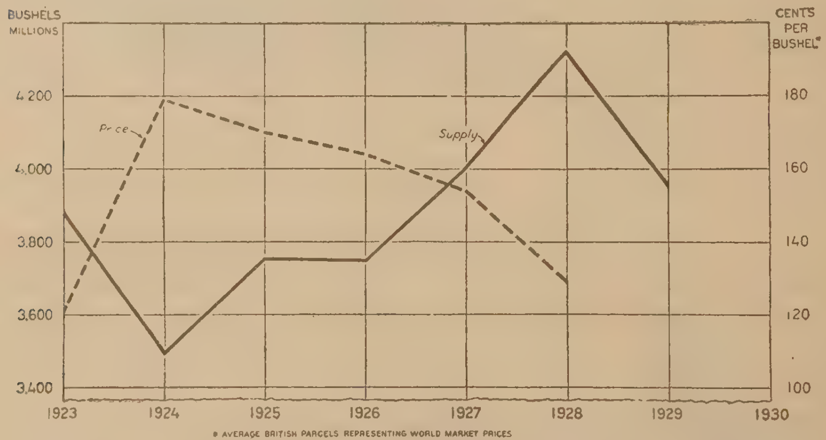

FIGURE 204.—World wheat supplies and prices. A small world supply of wheat caused prices to be high in 1924 and larger supplies lowered the price for each succeeding year through 1928

1928 season. This addition to the carry-over has the same effect as a similar addition to the crop.

The effect of world supply upon wheat prices can be judged from a study of the relation of world supplies to prices in world markets during the past few years. Figure 204 shows world supplies and prices for the years 1923 through 1928. Prices rose from 1923 to 1924 on account of a great reduction in the crop, and then declined through the five years 1924–1928 on account of increases in the world's supply.

Upward Trend in Demand

The accompanying chart, Figure 204, shows that in 1928 a supply of wheat much larger than that of 1923 sold at higher prices. This indicates clearly that there has been an upward trend in demand through these years 1923–1928. Wheat requirements of there world are constantly growing. In the 25 years preceding the World War the wheat supply of the world increased at a rate of about 74,000,000 bushels

per year, and yet the price of wheat did not fall. Prices of wheat in the United States rose through most of the period, along with the rise in the general price level. In the past few years, 1923 to date, it appears that the world would take, on the average, about 70,000,000 bushels more wheat per year without reducing prices. In other words, in relation to the demand for wheat, the world's supply of 3,877,000,000 bushels in the 1923–24 season would be equivalent to about 4,297,000,000 bushels in the 1929–30 season. Stated in another way, 4,297,000,000 bushels of wheat could have been disposed of in the 1929–30 marketing season on the basis of about the same prices as were realized for the 3,877,000,000 bushels available in the 1923–24 season.

After determining that changes in world supplies cause changes in world prices, and that there is an upward trend in demand which is the equivalent of about 70,000,000 bushels a year without changing prices, the next question is, How can we determine the probable world price level for any given season after we have a fairly reliable estimate of the world's supply?

Adjusting the supply of each of the past few years to that of the past season by adding 70,000,000 bushels a year for each of the years 1923 to date, and studying the relation of this supply to price, we find that there is a measurable relationship. The relationship is shown in Figure 204. This chart shows that on the basis of the demand for the 1928 crop, a supply of a little over 4,200,000,000 bushels would result in a price of about \$1.28 per bushel in British markets, and that a supply of about 3,750,000,000 bushels would sell for nearly \$1.80 a bushel. Prices for variations in supply between these two figures can be estimated approximately along this line. To determine an approximate average price for any subsequent crop, for example, it is necessary to move the line over to provide for the addition of 70,000,000 bushels annually to the demand. Should the world's supply for the 1929–30 season, for example, have been 4,000,000,000 bushels, the average price of wheat on British markets would probably have been a little over \$1.60 per bushel. One hundred million bushels more or less than four billions would have increased or reduced the price by about 14 cents per bushel.

Demand Conditions Vary Somewhat

In the past six years prices have varied somewhat from the straight line drawn through the chart in Figure 205, and it is never certain that the average price for any subsequent season will fall exactly on the line adjusted for the trend of demand to that season. There is a tendency for demand to increase at the rate of 70,000,000 bushels per year, but conditions vary somewhat from year to year.

The relation of the price of wheat in the markets of the United States to British prices depends upon the cost of transferring this wheat to the British markets, and the supplies of the different classes of wheat in the United States. For the United States to sell wheat on the British markets, prices must be low enough in relation to the prices in those foreign markets to be profitable to ship the wheat to these markets. When the United States has a very large crop of hard winter wheat, prices must be on an export basis for most of the year to dispose of the surplus. Under these conditions prices at Kansas City for export wheat will average about as much as the transfer costs below prices at Liverpool. On the other hand, when the hard winter wheat crop is short, as it was

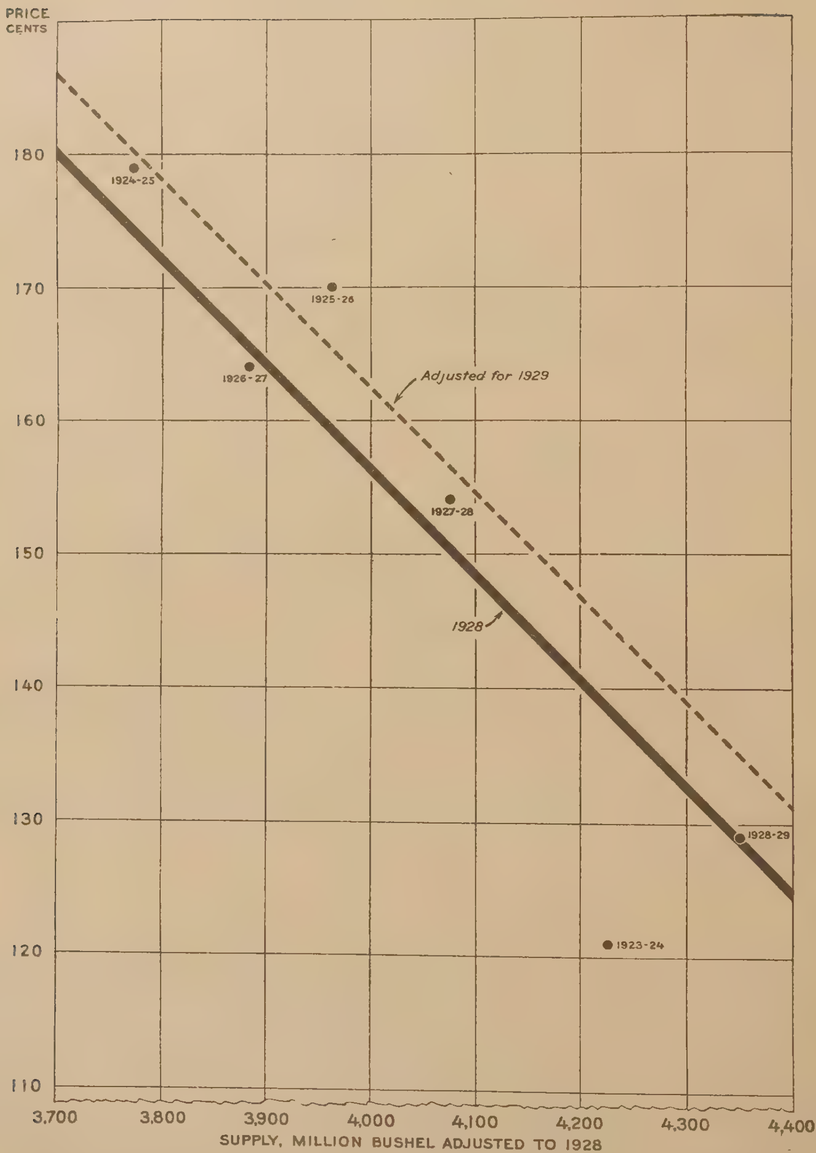

FIGURE 205.—World wheat supplies and prices 1924-25 to 1928-29. For the past few years the relation between the supply and price of wheat has been such that an increase or decrease of 100,000,000 bushels in the total world supply has been accompanied on the average by a decrease or increase of about 8 cents per bushel. In addition there has been an annual increase in world demand of about 70,000,000 bushels

in 1925, most of that wheat may be wanted in the United States, and domestic millers will bid up the prices above an export basis to prevent the wheat from being exported. In estimating the price of wheat at Kansas City, therefore, it is necessary to take into account not only the necessary price margin for export but also the quantity of the surplus of hard red winter wheat to be exported.

The relation of supply in the United States to usual domestic requirements is an important factor in determining the prices of other classes of wheat in the United States. The supply of soft red winter wheat has been short of domestic requirements in four out of the past six years, and in those years the prices of that class of wheat in St. Louis have averaged above those of hard red winter wheat (fig. 206), which has been on an export basis most of the time. When the supply of soft red winter wheat amounts to about 200,000,000 bushels, the price of that class in St. Louis will average about the same as that of hard red

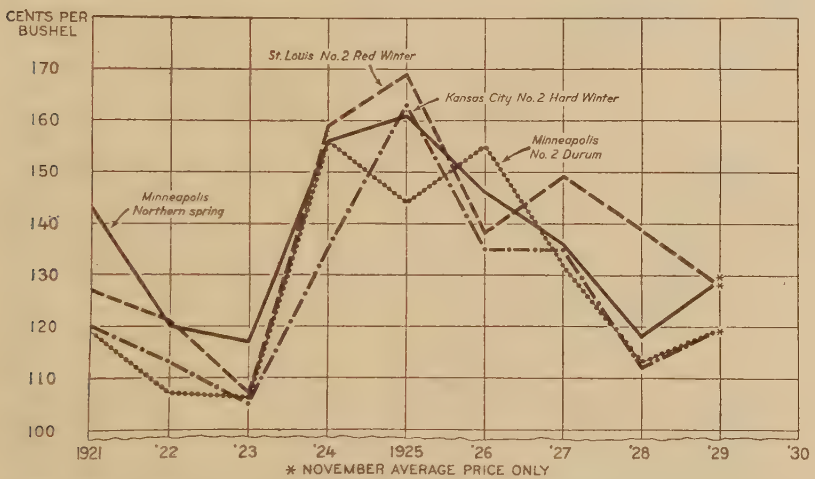

FIGURE 206.—Prices of wheat by classes 1921–1929. Although the prices for each class of wheat are dominated by the general world wheat situation, they also depend upon the supply of the particular class relative to the demand for it

winter wheat when it is on an export basis. The hard red spring wheat crop has been short of domestic requirements in three years out of the past six, and it is now short. When this crop is short the tariff protects it against the importation of Canadian spring wheat, so that the price of this class of wheat can rise above an export basis. The white and durum wheats are usually on an export basis and their prices are determined largely by foreign competition and the demand in foreign markets.

Factors Influencing Durum Wheat

Although durum wheat prices are affected to some extent by the size of the world crop and the prices being paid for other types of wheat, they are mainly dependent upon the world's production of durum wheat. When the crops of North Africa and Italy are short, there is likely to be a good demand for durum wheat from the United States and Canada; and when these crops are moderate, prices may be relatively high—even higher than those of the hard red spring wheat.

It is much more difficult to determine the probable course of prices during a season than to determine approximately the average price after the supply for the season is known. The course of prices during the season is affected not only by the available and prospective supplies but also by the various conditions of the market and the location of supplies. One method of judging the probable course of prices during the season is to determine first the probable average for the season in relation to average prices of previous years, and then to compare other conditions of the current season with those prevailing in other years. For example, early in the past season it became apparent that the supply and demand conditions were similar in many respects to conditions prevailing in the 1923–24 season, and conditions to date in the present season appear to be similar to those prevailing in the 1924–25 season. (Fig. 207.) In making these comparisons differences

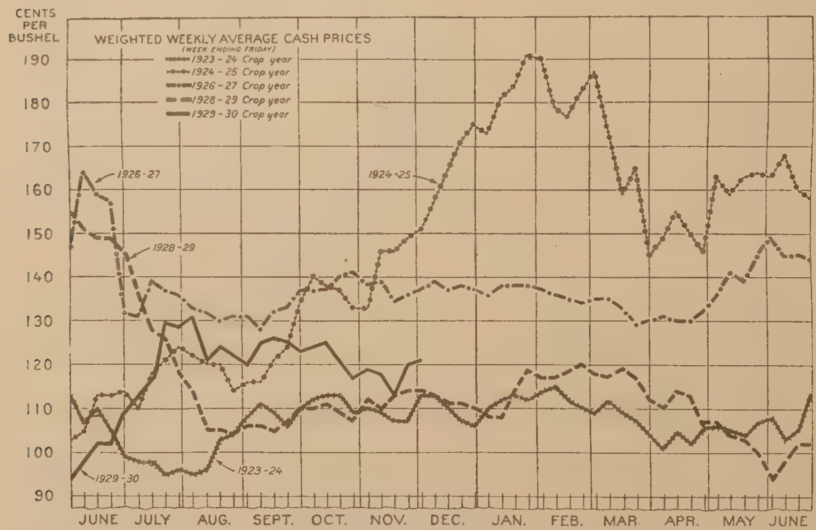

FIGURE 207.—Prices of No. 2 hard winter wheat at Kansas City 1923–24 to 1929–30. The seasonal trends of wheat prices vary greatly from year to year, but they tend to correspond for years having similar supply-and-demand conditions. After August, conditions in 1928–29 were much like those of 1923-24. In the beginning the 1929–30 season had many characteristics like those of the 1924–25 season

must be taken into account in forming a judgment as to the probable course of prices for the season.

Although an analysis of the past relations of supply and demand conditions to prices usually provides a basis for determining approximately the prices to be expected for wheat in our principal markets, it must be observed that conditions are continually changing and that conclusions from past experiences must be modified continually as conditions change.

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WHEAT Protected from Black Stem Rust by Dusting with Sulphur Black stem rust of wheat can be controlled and the yield and quality of grain increased by dusting the growing plants with very finely divided sulphur dusts. The essentials in preventing rust losses by dusting are the right kind of dust, applied at the right time with an efficient dusting machine.

That dusting will practically control stem rust, at least in experimental plots, is shown by the results of extensive experiments made in Minnesota in 1925, 1926, and 1927. In 1926, for example, at Crookston, Minn., there was 75 per cent of rust on Marquis wheat that had not been dusted, and the yield was 22 bushels an acre of wheat that graded No. 3 dark northern. On neighboring plots dusted three times there was only 5 per cent of stem rust and the yield was 29.5 bushels of wheat grading No. 1 hard spring. Plots dusted six times had only a trace of rust and yielded at the rate of 34.5 bushels an acre. The maximum increase in yield as a result of dusting therefore was 12.5 bushels an acre, although the stem-rust epidemic was not particularly severe.

In 1927, an epidemic year, the average yield from nondusted plots at Morris, Minn., was about 18 bushels an acre of Sample-grade wheat, while that from plots dusted three times at proper intervals was about 30 bushels of good wheat. At Crookston, Minn., in the same year, the nondusted plots had about 65 per cent of rust and yielded 25 bushels an acre of No. 5 wheat, while some of the dusted plots had only about 12 per cent of rust and yielded at the rate of more than 40 bushels an acre of wheat grading from No. 1 to No. 3. Experiments were made in 1928 also, but there was relatively little stem rust, and the results, therefore, were not conclusive. But it is evident that rust can be controlled if the right kind of dust is applied to the plants thoroughly and at the right time.

In order that sulphur dust may be effective it must be very fine, light, and fluffy, so that it may cover the plants thoroughly and uniformly and stick to them through wind and rain. Several satisfactory dusts are now on the market. Heavy dusts, consisting of coarse particles, are not satisfactory. Even the best dust in the world will not prevent rust, however, unless it is applied at the right time.

Spreads by Means of Spores

Wheat must be dusted before the rust spores reach it. The rust fungus spreads by means of spores, minute reproductive bodies about one five-thousandth of an inch long, produced in countless millions. They are blown about by the wind, germinate in droplets of rain or dew on wheat plants, and send their tiny germ tubes into the wheat, where they grow, branch, and rob the wheat of the nourishment needed for the kernels. This whole process of infection may require only a few hours. The sulphur dust prevents the spores from germinating or sending their germ tubes into the wheat plants, but it can do no good after the rust is once inside the plants. When, then, is the time to begin dusting?

The first application of dust, at least in the spring-wheat region, should be made about when the wheat is heading, as there usually are but few stem-rust spores in the air before that time. In some seasons this one application may be enough, but usually at least two additional applications, made at intervals of about a week, are necessary.

The proper times of application will differ, of course, in the different regions and must be determined for each region if dusting ever comes into practice. Timeliness of application is essential, but thoroughness is equally so.

In order to be thoroughly protected, wheat plants should be covered with a fine film of dust. This requires a specially constructed dusting machine which blows a fine cloud of dust onto the plants with such force as to insure uniform and effective distribution. Small hand dusters are often used in experiments, but horse-drawn or self-propelled power dusters, capable of dusting 50 to 100 acres a day, are required for practical work. Some of these machines have been tried and are at least fairly satisfactory, but improvement is necessary. The quantity of dust required depends somewhat on the efficiency of the dusting machine used, but from 20 to 30 pounds an acre usually are enough.

Economic Problems Involved

Is dusting a practicable method of rust control? That depends on the net return to the farmer. Good dust costs about 5 cents a pound, making the cost of materials for dusting an acre three times about $3.75. The value of the grain broken down in dusting would be about $2. Add man labor and horse labor, and the total, exclusive of interest and depreciation on the machine, would be about $6 to $8 an acre. The machines now on the market cost between $400 and $500 but are not yet entirely satisfactory.

Two problems must be solved if dusting is to be practicable. More efficient dusting machines must be devised, and it must be determined whether dusting will pay over a period of years, rust-free years and rust years. Manufacturers undoubtedly can perfect the machines—maybe airplanes can be used successfully—but no one can yet tell a farmer whether it would be profitable to dust year after year. It would help a great deal if the probability of epidemics could be predicted, but that is not yet possible. A wheat grower undoubtedly would make more money by timely and thorough dusting in a bad rust year, but he probably would lose money if he dusted when there was to be very little rust. The rust can be controlled with sulphur dust, but whether it would pay a farmer to dust for a period of years must be answered by long-time experiments made under practical conditions on the farm.

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Lee H. Person, Jr.,
Agents, Stem Rust Investigations, Bureau of Plant Industry.

WHEAT Requirements of Deficit Countries Have Grown Since the War The demand for wheat in the countries of deficit production throughout the world has increased since the World War. Before the war the demand in countries that did not produce sufficient wheat to meet their own bread requirements created an average annual flow of wheat and wheat flour from countries of surplus production equivalent to 675,000,000 bushels. During the season 1927–28 world demand resulted in a flow of 818,000,000 bushels—an increase of 143,000,000 bushels. Profound changes have taken place at the sources of supply

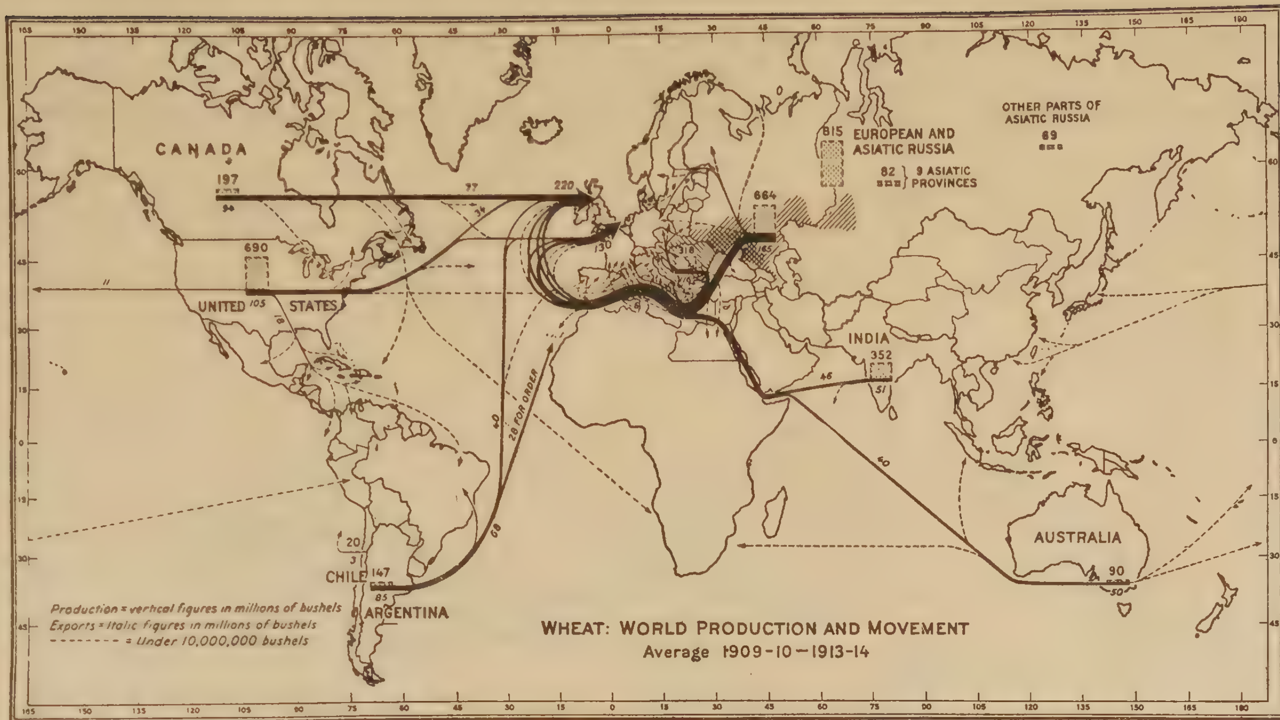

FIGURE 208.—Wheat, including wheat flour: World movement in response to world demand, average 1909–10 to 1913–14. Before the World War, the bulk of Europe's imported wheat supply passed westward through the Straits of Gibraltar from Russia, the Danube Basin, British India, and Australia. Shipments to Europe from the United States, Canada, and Argentina were incidental to the quantity of surplus produced in each country. The United States and Argentina supplied the wants of South America; Australia and Canada supplied the wants of Africa; the United States practically had a monopoly of the trade in the Orient. Port movements are not indicated on this map

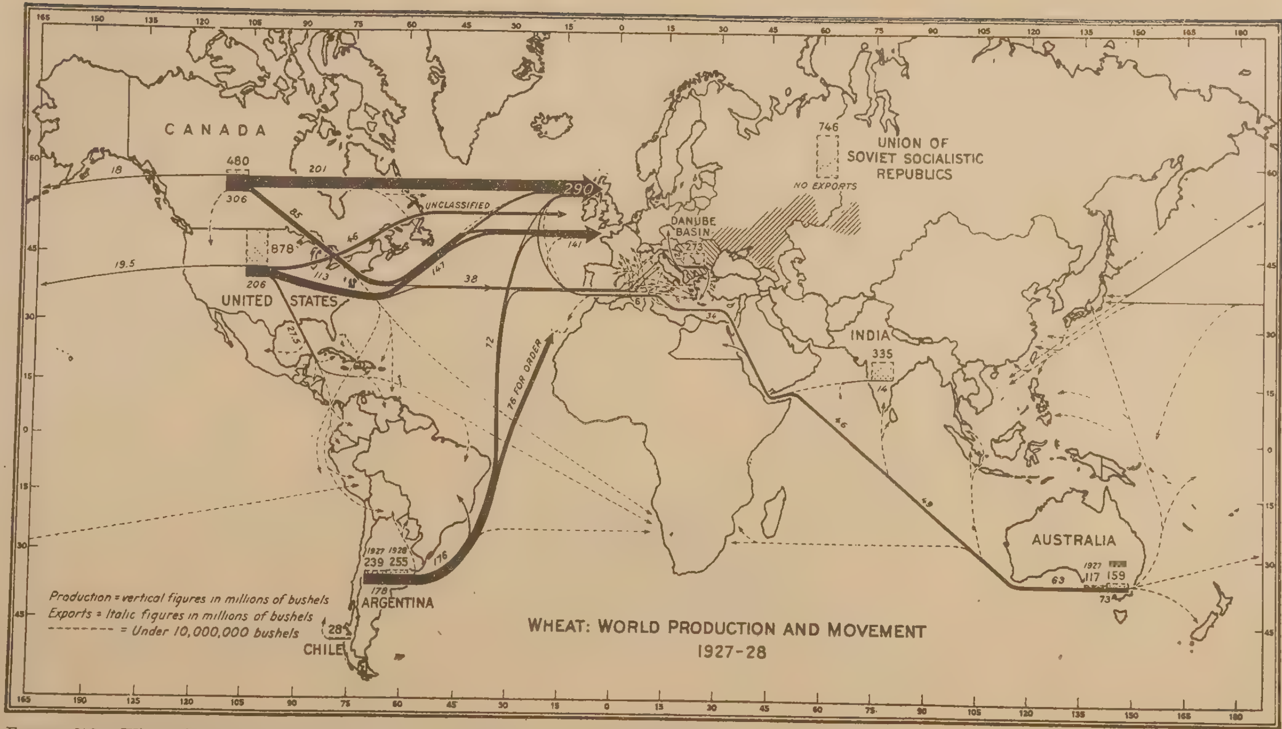

FIGURE 209.—Wheat, including wheat flour: World movement in response to world demand 1927–28. In 1927–28 the bulk of wheat supply passed eastward across the Atlantic Ocean from Canada, the United States, and Argentina. Russia was dropped out of the picture as a source of export wheat and the exports from the Danube Basin and British India have dwindled to 33,000,000 bushels and 9,000,000 bushels, respectively. Australian exports have increased. In every country of Europe, in the Orient, the West Indies, and South America, Canadian wheat and flour are crowding United States products in the world's markets. Port movements are not indicated on this map

from which the deficit countries have been accustomed to seek sufficient wheat to cover their requirement of daily bread.

The peasants of Russia have eaten most of their wheat in recent years and this former giant competitor of the United States wheat farmer has practically disappeared as a factor in feeding western Europe. The peasants of Rumania are eating more corn and feeding more corn to their cattle and hogs. Corn production has taken the place of wheat production to a large extent and Rumania, too, has ceased to be a prime factor in western markets. India has eaten more and exported less wheat in recent years than before the World War. Under the influence of these and other factors the mighty stream of nearly 370,000,000 bushels of wheat that flowed westward as grain and flour, by rail overland and by ship through the Mediterranean to Italy and France and on through the Straits of Gibraltar, up the Atlantic, and through the English Channel to the United Kingdom, Belgium, Netherlands, Germany, and Scandinavia has dwindled to 83,000,000 bushels—a shortage in the eastern supply of 287,000,000 bushels.

Production in Europe

In spite of the nearness of their markets the farmers of Europe have found it increasingly difficult to meet on a competitive basis the rising flood of wheat from the Western Hemisphere and are producing less wheat since the World War. Only the best lands can profitably be seeded to wheat. Marginal lands have been put into more lucrative crops or allowed to run to grass as pasturage for dairy herds. In 1927–28 the farmers of deficit western Europe produced 984,000,000 bushels of wheat—34,000,000 bushels less than their pre-war average of 1,018,000,000 bushels.

The population of the cities and industrial districts of Europe has increased more rapidly than that on farms. This has increased the domestic demand for wheat, while the domestic supply has decreased. The cities and industrial regions of western Europe united in demanding the importation of 661,000,000 bushels of wheat in 1927–28, an increase of 62,000,000 bushels above the pre-war average. Part of this increased demand is accounted for by the 34,000,000 bushel decrease in wheat production in western Europe. Part is accounted for by increased population. About the middle of the pre-war period, 1909–1913, the population of Europe outside of the present boundary of Russia was about 340,000,000. By 1927, the population outside of Russia had increased to about 370,000,000. A large part of the increase of 30,000,000 inhabitants in Europe depend for their wheaten-bread supply upon sources outside of Europe itself, necessitating increased shipments from overseas. In parts of Europe the increased demand for wheat may be attributable to higher standards of living adopted since the war, though it is questionable whether the average rate of living in western Europe to-day is as high as it was before the World War.

Increased Call on the Western Hemisphere

The eastern supply of wheat for Europe, as noted above, had fallen off 287,000,000 bushels in 1927–28 and the demand had increased 62,-000,000 bushels, which created a demand on the wheat supplies of the Western Hemisphere totaling 349,000,000 bushels greater than that of

pre-war days. Before the World War the United States, Canada, and Argentina shipped to Europe an average of 229,000,000 bushels of wheat. In 1927 28 the Western Hemisphere shipped 578,000,000 bushels of wheat across the Atlantic.

Canada has taken prompt advantage of the increased European demand and the decreased competition of Russia, the Danube Basin, and British India. Canada shipped to Europe during 1927–28 wheat and wheat flour equivalent to 271,000,000 bushels. Canada has an advantage in the British market and sent 198,000,000 bushels of wheat to Great Britain, as compared with 45,000,000 bushels from the United States and 20,000,000 bushels from Argentina. Canadian shipments to the continent totaled 73,000,000 bushels.

The United States shipped to Europe as grain and flour the equivalent of 159,000,000 bushels of wheat in 1927–28 against a pre-war average of 75,000,000 bushels. This represents an increase of 84,000,000 bushels or 112 per cent, compared with Canada's advance of 215 per cent. Argentina shipped 148,000,000 bushels of wheat to Europe in 1927–28, as compared with an average of 68,000,000 bushels before the World War—an increase of 80,000,000 bushels or 118 per cent. The volume of United States wheat flowing eastward is being squeezed and narrowed by the mighty pressure of wheat streams flowing across the Atlantic to the north and south of our own.

Competition in Oriental Markets

The United States wheat farmer is brought into sharp competition in Asia and the Pacific islands with the wheat growers of Canada and Australia. Before the World War this western demand created an average flow of wheat and wheat flour equivalent to 21,000,000 bushels. The corresponding movement was 60,000,000 bushels during 1927–28. Before the World War, the United States shipped the equivalent of 11,000,000 bushels, as wheat and flour, to the Orient and the Pacific islands. In 1927–28, the United States still held first place with 20,000,000 bushels; but Canada was a strong competitor with 18,000,000 bushels. Australia shipped to Asiatic and Pacific ports 17,000,000 bushels. Shipments from India to near-by points have undergone practically no change.

Africa has increased its demand for foreign wheat and flour from an average of 8,000,000 bushels during 1909–10 to 1913–14 to 26,000,000 bushels in 1927–28. Australia, the geographically natural source of supply, has increased its shipments of wheat to Africa from an average of 5,000,000 bushels before the World War to 21,000,000 bushels in 1927–28. Russia and the Danube Basin, which shipped about 1,000,000 bushels of wheat, each, to Africa before the World War, have dropped out of the picture. Canada continues to ship about 1,000,000 bushels annually. Argentina appears as a new source of supply and sent 1,000,000 bushels in 1927–28. In the same crop year the United States shipped the equivalent of 3,000,000 bushels, mostly flour, to South African ports.

The demand for wheat in South America before the World War called for exports from surplus countries averaging 26,000,000 bushels annually. In 1927–28, shipments of wheat to South American deficit areas reached 40,000,000 bushels. Argentina is the geographically natural source of supply for the South American wheat demand and

that country's shipments increased from a pre-war average of 17,000,000 bushels to 29,000,000 bushels in 1927–28. Australia continues its shipments of wheat to Peru of about 1,000,000 bushels annually. Shipments from the United States, for the most part flour, increased from the equivalent of 5,000,000 to 8,000,000 bushels. Canada appeared as a new source of supply, and shipped about 1,000,000 bushels in 1927–28. Chile produces a surplus of about 1,000,000 bushels that is shipped north to near-by countries.

Direction of Canada's Trade

Before the World War, Canada shipped 4,000,000 bushels of wheat annually to the United States, 1,000,000 bushels to Newfoundland, and 2,000,000 bushels to the islands of North America. In 1927–28, Canada shipped 8,000,000 bushels of wheat to the United States, 2,000,000 bushels to Newfoundland, and 5,000,000 bushels to the islands of North America. During 1927–28, Canada exported through United States ports 85,000,000 bushels of wheat. On the other hand, the United States exported 46,000,000 bushels of wheat through Canadian ports. This interchange of port facilities is a postwar development of the wheat trade of the two countries.

The United States shipped an average of 13,000,000 bushels of wheat to Mexico, Central America, Panama, and the islands to the south and east before the World War. Since the war this trade has increased to 16,000,000 bushels. These areas are the natural markets of the United States and serious competition from Argentina is not to be expected. On the other hand, Canada is rapidly gaining control of the markets in British insular possessions.

The outstanding feature of these changes in the demand for and supply of wheat throughout the world is the shift of Europe's chief sources of supply from Russia, the Danube Basin, and British India to Canada, the United States, and Argentina. Great Britain looks to Canada for most of the wheat destined for consumption in the United Kingdom, the United States supplying certain required grades.

On the Continent, the United States has maintained its trade in wheat more nearly on an equal footing with Canada and Argentina. Supplying the continental demand is a matter of grade, quality, and price.

In the Orient and Pacific Islands, increased Australian competition added to that of Canada has endangered markets, in which, before the World War, the United States held practically a monopoly.

LOUIS G. MICHAEL,
Principal Agricultural Economist,
Bureau of Agricultural Economics.

WHEAT Seed Cleaned and Treated for Smut by Portable Machine Smut in growing wheat reduces the yield of the wheat. Stinking smut, or bunt, in market wheat reduces its market value. Smut in wheat presents a serious handicap to the efficient, economical marketing of the grain. All smutty wheat must be passed through smut-removing machines before it is suitable for milling purposes.

Stinking smut can be controlled effectively by any one of several simple treatments, except in areas where soil infestation occurs or

when the seed is heavily infected with smut spores. The most common treatment is to dust wheat with copper carbonate dust. All seed wheat should be thoroughly cleaned before dusting and before seeding, as proper cleaning removes the weed seeds from the grain. The dust is applied to the seed wheat at any time before planting. Both operations of cleaning and treating are necessary for most profitable wheat raising.

To encourage efficient cleaning and treating of seed wheat on the farm, the Bureau of Agricultural Economics assisted in designing, testing, and putting into operation, a portable combination seed-grain-cleaning and seed-treating machine for a group of farmers in California who started the project as a community enterprise. The machine, mounted on an automobile chassis, traveled from ranch to ranch on a schedule arranged by a local farm bureau committee supervised by the county agent.

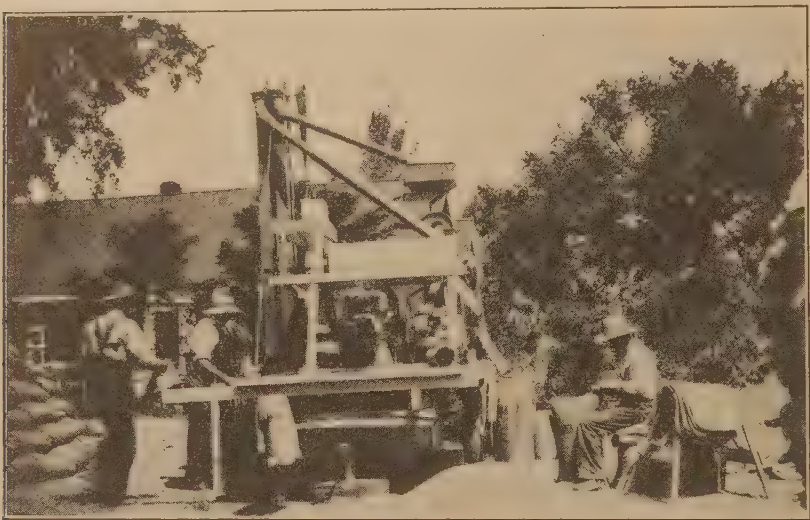

FIGURE 210.—Combination seed-grain-cleaning and dust treating machine in operation

The machine is operated by two men—an operator in charge who is with the machine at every farm and who supervises the work of cleaning and treating, and an employee of the farm who is temporarily assigned to the duty of sacking or otherwise removing the cleaned and treated grain from the machine.

Equipment Paid for the First Season

During the first season's operation the combination machine, which had a capacity of 60 bushels per hour, handled over 1,000 tons or about 33,000 bushels of grain. On the basis of a charge of $2.50 per ton the equipment was paid for during the first season's operation from receipts of that year. In addition, the users of the machine were given a refund of about 55 cents per ton of grain handled. This made a net cost to the users of $1.95 per ton or about 6 cents a bushel, including the cost of the copper carbonate dust. During the second season's operation the outfit handled about 1,500 tons of seed wheat. barley,

and oats, at a cost of approximately $1.60 per ton, or about 5 cents a bushel.

The advantages of cleaning and treating seed grain by means of a portable outfit are manifold. The work costs the farmer less than if he has it done commercially or does it with his own equipment. If the work is done commercially the grain to be cleaned must usually be hauled from the farm to the warehouse or elevator and the cleaned grain must then be hauled back again.

In many instances the individual farmer who does his own cleaning and treating does not have the best equipment because of its comparatively high cost in relation to the quantity of work he has for it to do. A community cleaner gives the farmer an efficient machine run by an experienced operator; he is saved the work of purchasing and handling the copper carbonate dust; and the dust can be bought more cheaply in large quantities.

Foreign Material Returned to Farmer

Then the farmer has returned to him for immediate use the foreign material that is removed from the seed grain during the cleaning process. The foreign material frequently consists largely of cracked grains, wild oats, other grains, and other seeds that are usable as feed on the farm for chickens, sheep, or hogs.

The successful operation during these two seasons of the community-owned portable cleaning-and-dust-treating machine has led one manufacturer to construct similar outfits for use in the Pacific Coast States. The advantages of cleaning and treating in one operation have led several grain-cleaner manufacturers to put on the market combination cleaning-and-treating machines of smaller capacity than the portable outfit here described, which are designed primarily for individual farm use.

George P. Bodnar,
Assistant Marketing Specialist,
R. H. Black,
Senior Marketing Specialist,
Bureau of Agricultural Economics.

WHEAT That Is Slightly Germinated Helps Flour When Sparingly Blended

In the commercial grading of wheat, germinated grains are classed as damaged grains and no more than 2 per cent of such grains is allowed for No. 1 grade of wheat. For every per cent of germinated grains over 2 per cent a progressive deduction in the price per bushel is made. Wheat containing 10 per cent or more of germinated grains is generally considered unfit for milling, and unless excessively moldy or musty is used for feed purposes. When excessively musty it is fit only for fertilizer and other industrial purposes. Occasionally, however, a premium has been paid for slightly germinated wheat.

Weight Loss During Germination

Experiments have shown that a wheat seed allowed to germinate for 12 days under controlled laboratory conditions loses more than 90 per

cent of its potash, about 80 per cent of its nitrogenous substances and phosphoric acid, 30 per cent of its fat, 50 per cent of its pentosans, and practically all its stored-up starch material. The weight of the seed decreases more than 90 per cent during that period. These losses are for the most part due to the transfer of the reserve materials from the seed to the little plant, made possible by the action of the enzyms. These changes begin very soon after the seed has been placed in an environment suitable for germination. The same process takes place but to a much slighter degree in newly harvested wheat which has been subjected to frequent rains while still in the shock or stack. Long exposure to alternate wetting and drying may, however, cause appreciable damage to the harvested grain still in the field.

Wheat which has been allowed to germinate for no more than two days has undergone very little chemical change. As a result of longer germination the wet and dry gluten decreases, and sugar and acidity increase. It is difficult, if not impossible, to detect slightly germinated wheat by chemical analysis, except possibly by the determination of the diastatic activity, which in sound wheat is considerably less than in germinated wheat.

The loss in weight of a seed during germination ranges from 1.5 per cent in 24 hours to more than 10 per cent in 120 hours. When the plumule is one-fourth the length of the grain the loss is about 1 per cent; when the plumule equals the grain in length, the loss is nearer 3 per cent.

Effect of Using Sprouted Wheat

Wheat which has germinated so that the plumule is more than 1 inch in length should be sparingly used for milling. Not much more than 3 per cent of such wheat can be safely mixed with sound wheat. Too much sprouted wheat produces a dough with puttylike characteristics. The use of as much as 8 per cent of this wheat will yield an inferior loaf; but a small quantity of wheat germinated even to this extent is not harmful beyond a slight weakening of the dough. The quantity of germinated wheat which can safely be used depends upon the length of time the wheat has been allowed to germinate. If the wheat is only slightly germinated, that is, up to about three days, even 20 per cent can be used with success. It is safer, however, to use 20 per cent of wheat germinated three days than 10 per cent germinated five days.

In the process of milling, hard wheat which has germinated behaves somewhat like a soft wheat. Germinated wheat possesses a more or less brittle bran, yields a smaller quantity of flour, and may yield flour of a somewhat darker color than that from ungerminated wheat. In general flour milled from partly germinated wheat contains not only a weaker gluten but a smaller quantity of gluten. Such flour has a lower absorption than flour from ungerminated wheat. The absorption decreases with the quantity of germinated wheat or the length of time of germination.

The Penalty on Slightly Germinated Wheat

It is difficult to justify the practice of penalizing slightly germinated wheat found on the market in view of the beneficial effects which a small quantity of such grains produces in bread baking. Normally,

wheat flour contains very little sugar, in fact, too little to satisfy the needs of the yeast in bread making. Owing primarily to the action of the diastatic enzym upon the starch, germinated wheat has a relatively high sugar content, and the addition of germinated wheat to sound wheat therefore makes available to the yeast a sufficient quantity of fermentable sugars for the whole process of fermentation. Thus not only is the time of fermentation of the dough reduced, but likewise that of proofing; a greater quantity of gas is produced, and the baked loaf has a larger volume. Further, the use of a small quantity of flour made from germinated grain improves the texture and color of the crumb, produces a browner and more pleasing crust, and imparts a desirable flavor to the bread. In fact some experiments have shown that even 20 per cent of slightly germinated wheat improves the quality of the bread. When used with sound wheat of low diastatic activity, germinated rye and other grains as well as germinated legumes may play the same important rôle that germinated wheat does in baking bread.

Considering the importance of the subject, data on the use of flour made from germinated grains in baking are very meager. Among the problems to be investigated are (1) the transformation which takes place in the seed during germination, (2) the effect of various combinations of sound and germinated grains, (3) the effect of flour from germinated grains other than wheat, and (4) the effect of flour from germinated grains of various kinds upon baked products other than bread.

Very little if any work has been done to determine the effect of using flour from germinated grains and legumes in the making of macaroni, biscuits, crackers, cake, etc., and to ascertain the kind of self-rising flour that can be made from them. A very recent development is the discovery that flour from germinated legumes exerts a bleaching effect upon wheat flour. The possibilities here are many, and this field of research is practically untouched. Many other problems regarding the effect of the various germinated grains and legumes on the products of the bakeshop await solution.

J. A. Le Clerc,
Senior Chemist, Bureau of Chemistry and Soils.

WOMEN Study Factory Products as Aid to Efficient Purchasing The home of to-day represents the result of factory production quite as much as it does the home maker's own activities. Rural home makers are recognizing this fact and are studying their responsibilities as purchasers of commercially manufactured products used in their homes. Studies, conducted through home demonstration work in many States, are made of such widely divergent articles as textiles for the house; garments and underclothing; shoes; hosiery; clothing accessories; staple, fancy, and fresh groceries; furniture; sick-room appliances and household medicines; water, lighting, and heating systems; refrigerators; sewing machines; wall and floor coverings; electrical equipment for the home; motor power for the house; paints, wall paper, and calcimine; various types of cooking, cleaning, and laundering equipment; beds and bedding; china; silverware; glassware; cutlery; and the like.

Accessories for personal and for household use are also studied, including clothing accessories such as dress trimmings, neckwear, handbags, umbrellas, scarfs, jewelry, and hair ornaments. Household accessories studied include pictures, magazines, books, draperies, curtains, lighting fixtures, pottery, and similar items.

Analysis of products is made from a standpoint of basic material used, conditions and processes of manufacture, design, serviceability for personal need, and economy of purchase considered on the basis of cost and the intended use. The knowledge and experience gained through these studies have made farm women more intelligent buyers, who know the essentials of good material and construction, what to buy and when to buy, when it is economical to invest a relatively large sum, when a cheaper product may well take the place

FIGURE 211.—Home demonstration group comparing types of weaves in yard goods as part of a study of ready-made merchandise for the home

of a more expensive one, and other matters of basic purchasing economy. As a result farm women have broadened their interests and knowledge and have gained a keener appreciation of the value of articles manufactured under sanitary conditions, and where beauty and basic value given for value received are matters of accepted factory policy. In addition, farm women have become interested in matters of satisfactory conditions in factories, constructive legislation, community sanitation, and other factors of general well-being.

Study of Bedding

Typical of these efforts is the study of bedding which has been made by the farm women of Illinois during the last three years under the guidance of home demonstration agents and the extension special-

ist in home management. Women were taught desirable standards of beds and bedding. Emphasis was put upon such items as construction of mattresses, ticking, comparative advantages of different kinds of fillers, and labeling. State laws regarding bedding were studied and mattresses and pillows were opened and examined by the women. Visits to mattress factories were made by women in those counties where nearness made this feature feasible. A few manufacturers of high-grade mattresses cooperated in every way from offering samples of materials used to allowing the women to visit their factories to see the processes of manufacture and renovation. First-hand observation of what appeared to be a first-class mattress but which, when opened by the women at a local meeting, was found to contain factory sweepings, dirt, cigar stubs, and other materials in defiance of the law, aroused great concern.

With the third year of study and increased recognition of the importance of comfortable and sanitary bedding, the idea developed of conducting a state-wide playlet contest to be based upon the theme of good mattresses. A state-wide committee of rural women was appointed. Four manufacturers who had already cooperated offered prizes for county, district, and State contests. The prizes for county and district contests were high-grade mattresses. The State contest prize included a box spring and mattress. Farm women in 84 community units wrote and presented skits and playlets before community groups. These were followed by 19 county or district contests. These districts represented a membership of from 8,000 to 9,000 women. Finally a state-wide contest was conducted at farm and home week at which time 600 people saw the eight competing teams present their playlets. The State committee with the aid of technical experts judged the plays. The State winners were invited to go with all expenses paid to Chicago and give their playlet before the annual meeting of the National Better Bedding Alliance.

FIGURE 212.—Home demonstration groups analyze pictures and frames as part of their study of readymade merchandise for the home

The State home management specialist stated that over 2,000 people saw the playlets, and commented:

> These contests have been remarkable in two particulars: First, in the expression of dramatic and playwriting ability of the women; and second, in the wide publicity it has given to the subject of choosing good bedding.

A demonstration by 4-H club girls on beds and bedding was given at the State fair as a result of the project. The project was considered so helpful by the rural women that the report of the State better-bedding committee of rural women concludes, "The com-

mittee suggests that this work be continued and a greater knowledge of better bedding be extended to the women of Illinois during the coming year."

Other Branches of Home Economics Study

Similar studies have been made in many phases of nutrition. Some of the matters considered were sources of food supplies, types of marketing (direct and indirect), steps in marketing (transportation, grading, inspecting, packing, processing, storing, distributing, financing), and cost of retailing.

In the field of clothing, yard goods and factory-made garments have been analyzed as to fiber, weave, suitability of material as to garment desired, cut of garment, seams, finishes, and seasonableness of style.

Similar analyses of household equipment and other home necessaries are being made, and greatly increased knowledge by rural consumers is resulting.

Exhibits, lantern slides, and actual use of equipment in testing circles have supplemented the technical instruction, but testing in their own homes by rural women has been adopted as the basic plan of teaching.

In many States, the groups of women visit local merchants to see at first hand and to learn from them and from the home economics specialists the comparative values of available products of the kind studied by them.

In New York State, rural home makers and home-demonstration agents spent three days in studying the wholesale market situation. They visited the produce terminal pier, learned how fresh produce is selected and packed for the market, saw methods of handling, selling, and distributing products from the commission houses, and observed the methods used at railroad piers in handling various perishable commodities. Retail markets, cold-storage and refrigerator plants, stockyards, poultry yards, the stock exchange, and railroad milk platforms were also visited as a part of their educational tour.

Since women buy 96 per cent of all dry goods, 87 per cent of all market products, 48 per cent of all hardware, and 11 per cent of all men's clothing, it is evident that the home maker of to-day should be trained regarding processes of manufacture and methods of marketing products.

A beginning in merchandising efficiency has been made by rural women, and their great interest in this field indicates that this type of instruction will be increasingly requested in any educational work undertaken by them. Such studies are to the advantage of all, for with widespread public knowledge of standards, manufacturing processes, and conditions of distribution, commercial groups can concentrate their efforts on matters of basic value rather than upon factors of superficial and unscientific appeal, and home makers recognizing real values will make purchases accordingly.

Grace E. Frysinger,
Senior Home Economist, Extension Service.

WOODLANDS Well Managed Bring in More Cash The great variety of products that a well-managed farm woodland can supply is perhaps best exemplified in the Appalachian hardwood region. Here, at any given time, valuable species of all sizes are likely to be intermingled with those of little or no present value. If the stand were to be cut for one product or species alone, the possible income from the woodland would not be fully realized. Under careful treatment saw logs, veneer logs, crossties, telephone poles, mine timbers, fence posts, and other products may all be produced from the same area, each representing the best use of certain trees. Under such treatment, also, the woodland is allowed to maintain healthy growing conditions. (Fig. 213.)

The secret of this all-round productivity lies in the fact that all of these products need not be marketed at any one time. While the

FIGURE 213 The well-managed Appalachian woodland tract will have sufficient trees of all sizes and species to furnish many kinds of products

necessary raw material is being produced by nature, aided by man, the question of just what product or products to convert it into should be governed by current market conditions. If prices are poor, or the present sizes of the trees render them unsuited to cropping for such products as will yield the best returns, their harvest may be deferred until conditions are favorable.

What can be done in the way of cutting a tract for saw timber and other crops and at the same time keeping it productive, is best realized from a concrete example of results actually achieved.

On a 40-acre hardwood stand in Webster County, W. Va., composed chiefly of white ash, red oak, and scarlet oak, with an admixture of soft maple, hickory, yellow poplar, and black gum, three successive cuttings have been made. Thirty years ago the first cutting, in the virgin stand, yielded 2,000 to 4,000 board feet per acre of selected oak and yellow poplar, leaving the woodland in a lightly culled condition. Growth on the remaining trees was slightly accelerated as a result.

The second cutting, 11 years ago, removed an average of 4,858 board feet per acre, two-thirds of this in the form of ties (fig. 214) and one-third in saw logs. This cutting also greatly improved the growing condition of the stand, for while it left standing the most rapidly growing young timber, enough of the stand was cut to allow plenty of light to reach the remaining trees.

FIGURE 214.—Hewn oak ties bring a good income from the farm woodland

The last cut, 2 years ago, took a little over 2,000 feet per acre—half as ties and the rest as logs.

228 Trees to the Acre

The present stand averages 228 trees to the acre. Thirty per cent of these are 10 to 14 inch trees with a volume of 5,000 board feet, and the remaining 70 per cent are 4 to 10 inch trees with a volume of 245 cubic feet.

The smaller, healthy trees are mainly free. Hence there is ample opportunity for the growth of the vigorous young stock, wisely left uninjured in logging.

The trees now 10 inches and over will again furnish the farmer with ties and lumber within the next 20 years as the opportunity presents itself. Sufficient smaller trees remain to take their places or, where these may later need to be thinned out somewhat, to furnish mine props or fence posts.

FIGURE 215.—The better class Appalachian farm is confined to the better soils, leaving the poorer in woodland

The total money yields from the two later cuttings, on the basis of prevailing prices, namely, $28 per thousand board feet for ties and $9 per thousand feet for saw logs, were $4,205 and $1,610, respectively.

This money, obtained from the 40 acres with no investment in extra equipment and with only the expenditure of the farmer's labor during the off season, has helped to buy additional farm machinery. Moreover, the prospects are that the income from this tract as long as the owner handles it judiciously will continue indefinitely.

Were he to clear this land for farming he would be handicapped by the sloping, uneven character of the ground. (Fig. 215.) At best he could crop it for several years, only to abandon it later. It would again grow forest crops, but much time would be lost before it could become as productive as it is now.

BERNARD FRANK,
Junior Forester, Forest Service.

WOOL of Long Staple is Most Profitable in Tests with Rambouillet Sheep Among the many difficulties in producing wool which will meet the highest market requirements, the length of fiber, or staple as it is commonly termed, is one of the most important. Close attention to breeding and management of range Rambouillet sheep is required to obtain a staple of wool from one year's growth which will exceed 2.5 inches. In fact, there are far too many fleeces which have staple lengths shorter than 2 inches.

Evidence that more consideration should be given to the length of staple in the breeding of range Rambouillet sheep is shown in the results of a study by the Bureau of Animal Industry of 1,460 fleeces produced at the United States Sheep Experiment Station at Dubois, Idaho. (Figs. 216 and 217.) This study clearly shows that the production of wool of full-length staple is more profitable with range Rambouillet sheep than the shorter staple generally produced.

It was found that as the length of staple increased the average weight of scoured fleeces also increased materially. With fleeces of from 3.1 to 3.5 inch staple the weight amounted to 47 per cent more than that of scoured fleeces with staple of 1.5 inches or less.

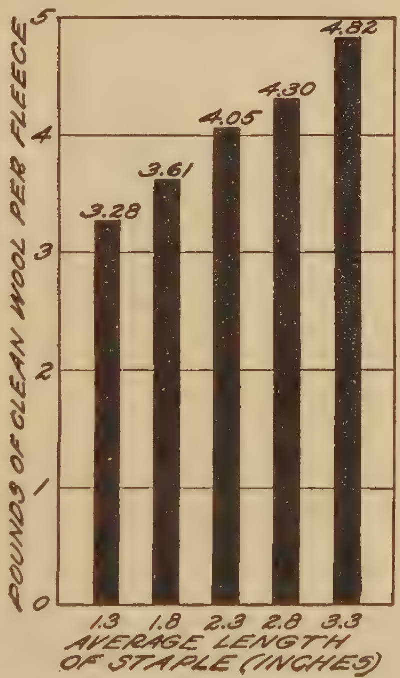

FIGURE 216.—Illustrating how length of staple is associated directly with weight of clean wool per fleece. There is a definite tendency for longer staple to occur in the fleeces yielding the heaviest weights of clean wool

Price per Pound of Long-Staple Wool Also Greater

The importance of length of staple to range sheep breeders is even more forcefully shown by a consideration of the financial returns from the 1,460 fleeces. The average value increased as the length of staple

increased, not only because of the increase in average scoured weight, but also because the price per pound of scoured wool increased from $0.96 for the shortest length of staple to $1.04 for the three longest lengths. With both the average weight of scoured fleece and the price per pound of scoured wool increasing as the length of staple increased, the average value of the fleeces with long-staple lengths was $5.01, or 59 per cent more than that of fleeces with a staple length of 1.5 inches or less. The average value of the fleeces of the 1.6 to 2 inch group was $3.61, or an increase of 15 per cent over the shortest-length group; that of the 2.1 to 2.5 inch group $4.21, or an increase of 34 per cent; and that of the 2.6 to 3 inch group $4.47, or an increase of 42 per cent.

The practical application that can be made of this increase in the length of staple is that, so long as it is consistent with other desirable fleece qualities, such as good density, fineness, and character, length should form a major consideration in the breeding operations of the flock. It is highly important, if increased profits are to be obtained from range-sheep production, that rams and ewes having fleeces with reasonably long staple, good density, fineness, and character should be selected for the breeding flocks. Those with fleeces of extremely short staple on the other hand should be excluded. Such a procedure gradually increases the length of staple in the flocks of range sheep.

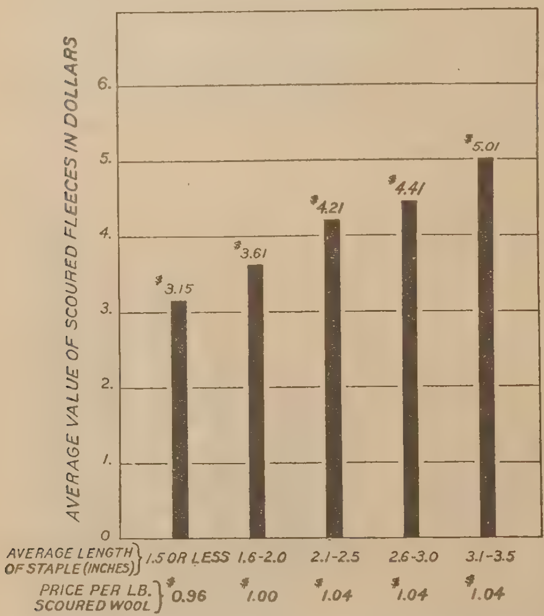

FIGURE 217.—Influence of length of staple of 1,460 Rambouillet fleeces on value of scoured fleece. Length of staple affects the value of fleeces, those having longer staple being worth more per pound and having more pounds per fleece

Breeders of purebred sheep who desire to keep accurate records will find it a comparatively simple matter to measure the length of staple of the fleeces of all sheep being selected for the breeding flock. This can best be done by parting the fleece of each sheep on the side, placing the end of a 6-inch rule against the skin in this part, holding the rule at right angles to the body of the sheep, and then reading the length of the staple as it extends along the scale of the rule.

This operation takes little time and the information obtained thereby enables sheep breeders to select for the breeding flock only rams and ewes that have a satisfactory length of staple. Continued breeding up, with this factor in mind, should give offspring with increased length of staple, thus obtaining a greater weight of scoured wool and hence materially increasing the profits obtained from the flock.

D. A. SPENCER,
Senior Animal Husbandman, Bureau of Animal Industry.

ZONING by Counties Promises Means of Rural Improvement Zoning practices in our larger cities have demonstrated that the best interests of the urban community are benefited thereby. Applications of the same fundamental practices in rural areas should prove of equal value to rural communities, and particularly to those communities where large areas of land are below the margin of successful cultivation as a result of recent changes in economic conditions.

Zoning in urban areas means the districting of available land for various classes of residential and commercial purposes in such a way as to provide the greatest benefits to the community. Zoning of rural areas should result in an economic classification of land for agricultural, forestry, recreational, and other purposes.

In urban areas, authorization for compulsory zoning is established and enforced under the police power. This is not true of rural zoning. Until such enforcement provisions as are desirable for successful rural zoning are established under police power, county boards of supervisors can undertake zoning programs, because they have the necessary authority to go ahead. In Wisconsin, tax-delinquent lands revert to the counties; counties may go into the timber-growing business, they may rearrange town boundary lines, they can discourage settlement and the establishment of schools and highways in submarginal agricultural areas, and they can encourage settlement in the better farming district.

Much Can Be Done by Counties

A study [13] of land-use problems in northern Wisconsin by the United States Department of Agriculture in cooperation with the Wisconsin College of Agriculture, led to the conclusion that, although the best rural zoning program is one that is not hampered by county boundary lines, much can be done by the counties in making a preliminary survey of land resources and basic economic and social factors. These results will be valuable in helping local authorities to deal wisely with their land problems pending the development of a more comprehensive State and Federal land policy.

A first essential of a county zoning program is the appointment of a committee by the county board to study land-use problems facing the board. This committee should be authorized to secure the services of a trained economist to plan and guide the taking of needed data and to complete the final report. The committee should be authorized to employ necessary clerical help and to employ well-informed town officers or old residents in each civil town to gather field data. The fact that local men know the location of farms, who the farmers are, the business of other landowners in the town and the location of the land owned by each, and the location of timbered tracts makes them invaluable cooperators.

County officers familiar with county records can be instructed to obtain tax-delinquency, school, and financial data. By cooperating with local industries the necessary information relative to industrial development in the county may be obtained.

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[13] Hibbard, B. H., Hartman, W. A., and Sparhawk, W. N. USE AND TAXATION OF LAND IN LINCOLN COUNTY, WISCONSIN. Wis. Agr. Expt. Sta. Bul. 406, 38 p., illus. 1929.

Hibbard, B. H., Swenehart, J., Hartman, W. A., and Allin, B. W. TAX DELINQUENCY IN NORTHERN WISCONSIN. Wis. Agr. Expt. Sta. Bul. 399, 28 p., illus. 1928.

Recording of Data Necessary

All field data should be recorded on schedules prepared in such a way as to facilitate transferring results obtained directly to base maps from the schedules. With the exception of certain financial, tax, school, and industrial data, the results of the survey can be pictured on these maps.

An important map used in the Wisconsin study pictured the area, location, and tax-deedable status of nontax-paying lands in the county represented by tax certificates which have not been sold to private parties. (Fig. 218.)

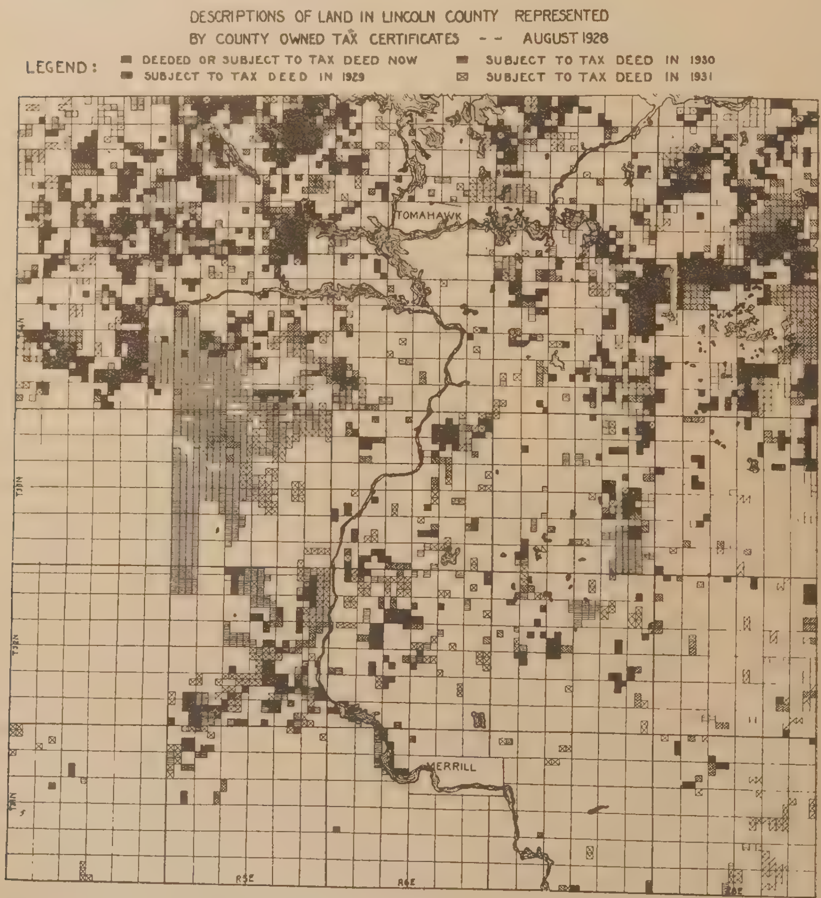

FIGURE 218.—The area of land in Lincoln County, Wis., represented by county-owned tax certificates in August, 1928. In Wisconsin tax certificates are subject to tax deed after the third year. Large areas of nontax-paying lands cripple county and local-civil-town finances, but at the same time place local authorities in strategic position to develop rural zoning programs

A second tax-delinquency map showing the area and location of all tracts of land against which there is one or more unredeemed tax certificate, regardless of ownership, is important because many speculators in tax certificates who are unable to resell are allowing the lands represented thereby to revert to the county, and if the certificates are sold the land usually reverts to the county a year or so later.

A land-not-in-use map shows a potential source of county-owned lands. By the term "land not in use" is meant all abandoned farm

land and all other unplatted lands not covered with a commercial crop of timber, nor included in operated farms, nor used for recreational or industrial purposes. Location of abandoned and operated farms can be pictured on a separate map to indicate the unsuccessful and successful farming areas. The agricultural-marketing centers by types of markets may also be indicated on this map.

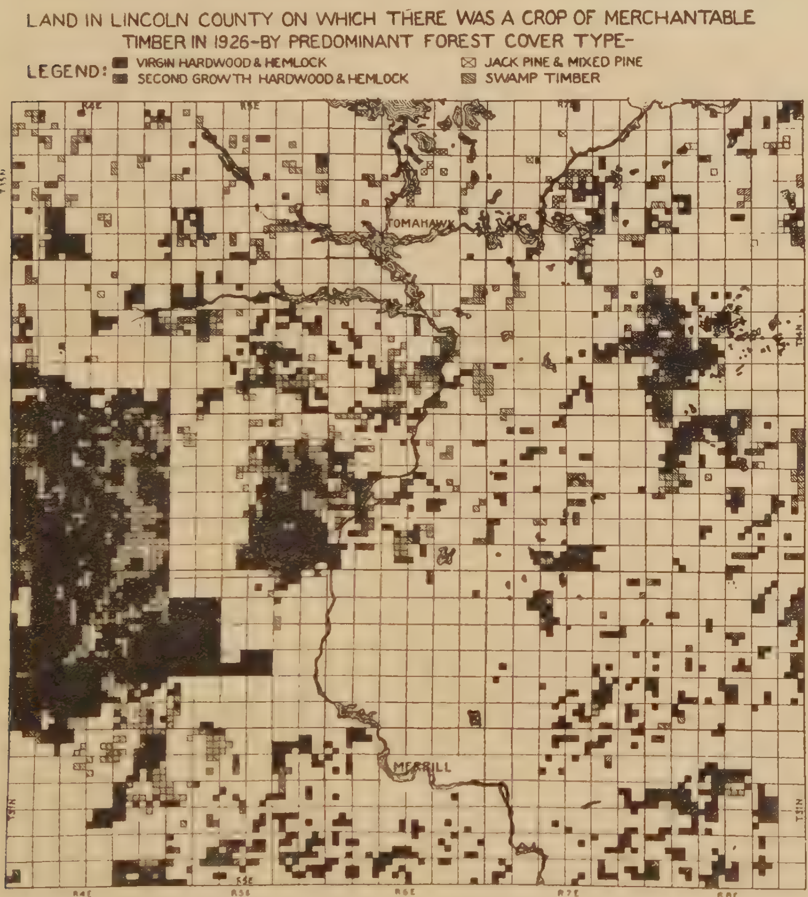

FIGURE 219.—The major part of the land in Lincoln County, Wis., on which there was a crop of merchantable timber in 1926 was in one large block. Many owners of these timbered lands are allowing them to go tax delinquent as soon as the timber is cut. This policy would be changed by a rural zoning program

Land Under Merchantable Timber

An important part of "land in use" to be mapped is land covered by a crop of merchantable timber. This is true (1) because timbered land is a major source of future county-owned land (after the timber has been cut), and (2) because such a map will help determine the degree of importance and practicability for taking steps to block out forest units to supply local industrial needs and the possibility of using certain areas of growing timber as nucleuses for potential forest units. (Fig. 219.)

Ownership and intent of ownership of land can be pictured on a map as the basis for a more intelligent understanding of the practicability of blocking out agricultural, recreational, industrial, and forestry units. Local officials, old residents, and abstractors are in position to record fairly accurate information on these factors.

A soil map and a map picturing other physical characteristics of the land are of utmost importance but are difficult to obtain unless the area has been surveyed. If soil maps are available, the different soil factors can be grouped and mapped as four or five soil types on the basis of their value for the type of agriculture predominating in the district. If no soil survey maps are available, effort should be made to picture the general location of these four or five types of soil.

With such facts as here outlined, in addition to an analysis of county and town finances with particular emphasis on expenditures and source of funds for schools and highways, supplemented by a fair degree of statesmanship and courage, county authorities are in position to take definite action toward the solution of land-use problems.

W. A. Hartman,
Senior Agricultural Economist,
Bureau of Agricultural Economics.

DEPARTMENT PUBLICATIONS

List of new Farmers' Bulletins, Leaflets, Department Bulletins, Technical Bulletins, Circulars, Miscellaneous Circulars, Statistical Bulletins, Miscellaneous Publications, Reports, and other numbered and unnumbered publications, issued from January 1, 1929, to December 31, 1929, classified by general subject matter

[These different types of publications are indicated by the letters preceding each serial number]

Birds and Game:		
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Manual for Bird Banders	M. P.	58
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Improved Reindeer Handling	Cir.	82
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Game Laws for the Season 1929–30	F. B.	1616
Directory of Officials and Organizations Concerned with Protection of Birds and Game, 1929	M. P.	57
Clothing and Fabrics:		
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Fires and Fire Protection:		
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Fire-Protective Construction on the Farm	F. B.	1590
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Reed Canary Grass	F. B.	1602
Soybean Hay and Seed Production	F. B.	1605
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The Air Seasoning of Western Softwood Lumber	D. B.	1425
Forest Planting in the Lake States	D. B.	1497
Timber Growing and Cutting Practice in the Lodgepole Pine Region	D. B.	1499
Propagation of Trees and Shrubs	F. B.	1567
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PRICES OF FARM PRODUCTS GRAPHICALLY PRESENTED

Charts Showing Changes in Prices from 1910 to Date, Cycles, and the Relation of Supplies to the Prices of Some Farm Products.

Prepared under the direction of the Statistical Committee: O. C. Stine, chairman, L. B. Flohr, secretary, J. A. Becker, S. W. Mendum, C. A. Burmeister, and L. M. Davis

The charts of farm prices are grouped in the following order:

(1) The farm prices of the principal agricultural products, monthly and annually, January, 1910, to December, 1929, in comparison with index numbers of the prices farmers pay for commodities they buy.

(2) Cycles in the prices of some important farm products.

(3) The relation of prices to supplies of some of the principal farm products.

Farm Prices

The farm prices represented in these charts are average prices received by or paid to farmers throughout the United States for all classes and grades of the product. For a description of the character of the price data, see Department Bulletin 1480, The Reliability and Adequacy of Farm Price Data.

The retail prices shown on each of these charts are averages of prices reported paid by farmers for many commodities which they buy. They include prices paid for food, clothing, furniture, building materials, machinery, fertilizer, and other items of equipment and supplies. For a description of the index number of retail prices, see Index Numbers of Prices Farmers Pay for Commodities Purchased, by C. M. Purves, a mimeographed circular of the United States Department of Agriculture issued in August, 1928.

Prices farmers receive for their products are also presented in the form of index numbers of all farm prices and of important groups of farm products. The index number of farm prices shown in Figure 23 represents a combination of the prices of 30 products through 1925, and 27 products thereafter. The complete list and method of construction of these index numbers will be found in the Supplement to Crops and Markets for August, 1924.

Reviewing prices of farm products presented in the figures that follow it will be observed that during the years 1910 to 1914 prices were fairly stable. During this period the price fluctuations for most products were not great and were neither markedly upward nor downward. This period has been used as a base for constructing index numbers to show the movement in prices of commodities and groups of commodities. In most cases prices turned upward very soon after the war began in Europe and rose very sharply in 1916 and 1917 when the United States entered the war. In some cases the rise in prices was due to unusual war demands. In all cases inflation was a factor in raising prices to higher levels. Farm prices generally increased sooner and more rapidly than the prices of the commodities farmers buy and the average of all commodities. Deflation and a business depression in 1920 and 1921 caused practically all prices to fall, some falling sooner and more rapidly than others. After the depression of 1921 prices of farm products rose more or less gradually to 1925, declined

into 1927, and then turned upward again into 1928. In the meantime the prices of commodities farmers buy had also declined, but not to a level so low as the prices of farm products. Since 1921 prices of commodities farmers buy have fluctuated to some extent but have remained on a level a little more than 50 per cent above the pre-war base. The upward trend of farm products, however, has had a tendency to improve the purchasing power of these products in relation to commodities farmers buy.

Price Cycles [1]

The prices of many farm products move in cycles with varying degrees of regularity and length. The prices of some crops have a tendency to move in cycles, but as a rule the crop-price cycles are irregular and uncertain. The prices of livestock and livestock products, on the other hand, generally present more or less fairly regular and definite cycles. It is commonly known that hog prices move in cycles of from three to six years in length. The tendency of farmers to plan to produce more when prices are high and to curtail production when prices are low or unsatisfactory causes these cycles. In the case of hogs, the relation of the price of corn to the price of hogs is an important factor in determining the character and extent of the cycle. The sheep and cattle cycles are necessarily longer than the hog cycles because in both of these cases more time is required to make any material change in production. The cycles in butter production are not quite so well defined as are those in beef production, but they are also of considerable length.

The Relation of Supply to Price

The supply of a farm product is an important factor in determining price. In some cases it is the supply within the United States that is most important in determining price, while in other cases the foreign supply may be more important than the home production. The relation of wheat supplies to prices is dealt with in another part ot this Yearbook. The relation of supplies to the prices of several products, including apples, potatoes, hogs, and cotton, is presented in charts hereafter.

In studying these charts it will be of interest to notice how prices decline as supplies increase or rise as supplies decrease. It will be noticed that in some cases small crops sell for more than large crops, and in other cases a large crop may sell for more than a small crop. These charts present a first step in an analysis of prices. In any case in which the relationship of supply to price has been determined, other conditions remaining the same, the probable average price for the season of any given quantity of the commodity can be estimated from these charts. In using these charts we must not overlook the fact, however, that other conditions, including changes in the general price level and changes in demand help to determine prices. In these charts changes in general price level and in demand have been eliminated but in making an estimate of a price for any season they must be taken into account.

[1] In actual prices the cycles are sometimes obscured by changes in the general level of prices. To show the cycles clearly, therefore, it is necessary to divide actual prices by some index number which tends to reduce all of the actual prices to a common base price level. To show cycles in all cases the actual prices have been converted to a common price-level basis.

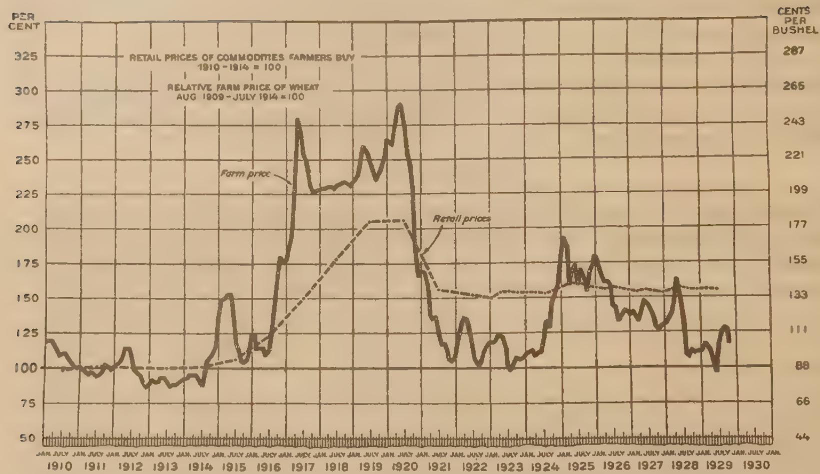

FIGURE 1.—FARM PRICES OF WHEAT AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Farm prices of wheat rose more rapidly and higher during the war than did retail prices of commodities farmers buy. In 1920 and 1921, however, wheat prices fell more rapidly and, most of the years since the war, have remained below the prices of commodities farmers buy. Year-to-year changes in wheat prices are due largely to changes in world production but also depend upon whether the various classes of wheat in the United States are on a domestic or an export basis

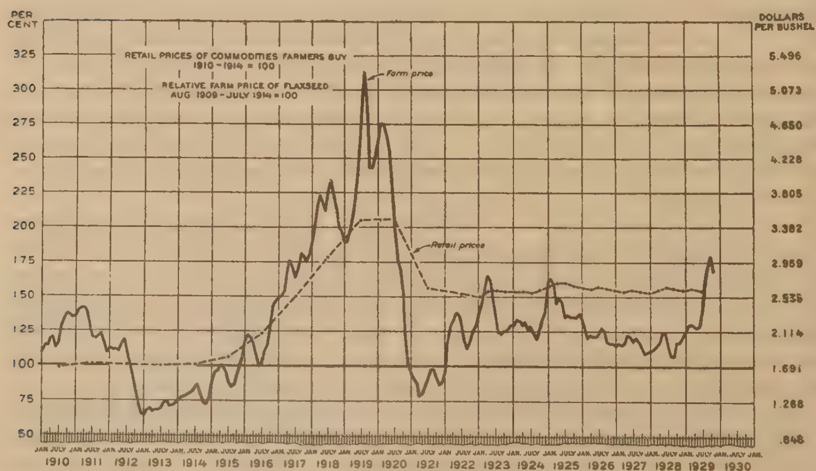

FIGURE 2.—FARM PRICES OF FLAXSEED AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Farm prices of flaxseed rose a little more during the war than the prices of commodities farmers buy. Since the war flaxseed prices have averaged lower, as compared with pre-war, than prices of things farmers buy. Yearly fluctuations of flax prices are dependent partly upon the flax crop of the United States but also upon the production of other countries, especially Argentina and Canada. As the United States has a high tariff and is on an import basis, however, prices are higher than the world-market basis

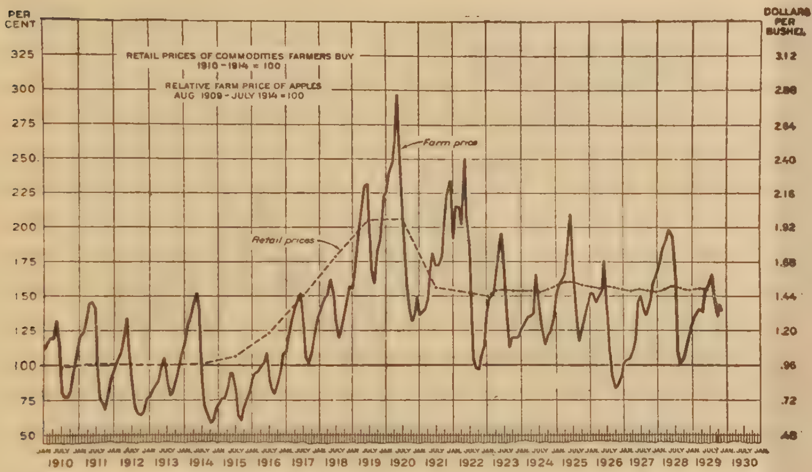

FIGURE 3.—FARM PRICES OF APPLES AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Apple prices are influenced from year to year very largely by the variations in the size of the apple crop. Usually there is a very pronounced decline from the high prices of summer apples in June and July to the lower prices for the main crop in September, October, and November. Thereafter they usually advance considerably with the depletion of the season's supply. The late European war at first depressed apple prices, but later inflation lifted them far above pre-war level

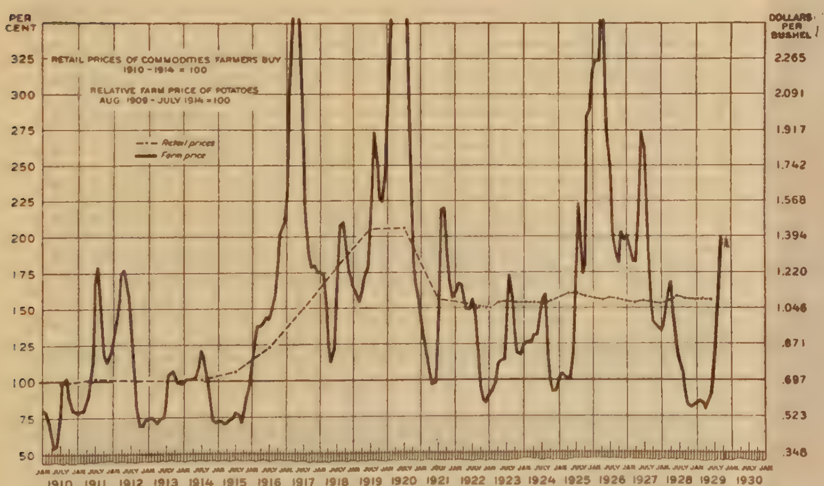

FIGURE 4.—FARM PRICES OF POTATOES AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Potato prices are influenced very largely by variations in the size of the crop in the United States. The high prices of 1911, 1916, 1919, and 1925 accompanied the very small crops of those seasons, and low prices of the 1912, 1914, 1922, 1924, and 1928 seasons accompanied the very large crops in those years. In seasons with very small crops there appears to be a tendency for marked advances after December but no material advance in seasons of very large crops

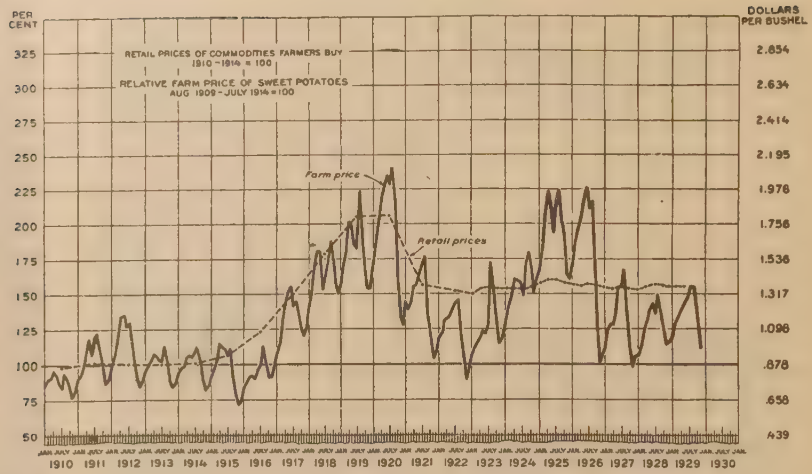

FIGURE 5.—FARM PRICES OF SWEETPOTATOES AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Sweetpotato prices are influenced from year to year very largely by the size of the crop and also by the supply of white potatoes. Sweetpotato prices usually decline from the high point of the season about July to a low point in November or December and in advance thereafter. War inflation and postwar deflation affected sweetpotato prices. High prices of 1925 and 1926 were due to unusually short crops in 1924 and 1925.

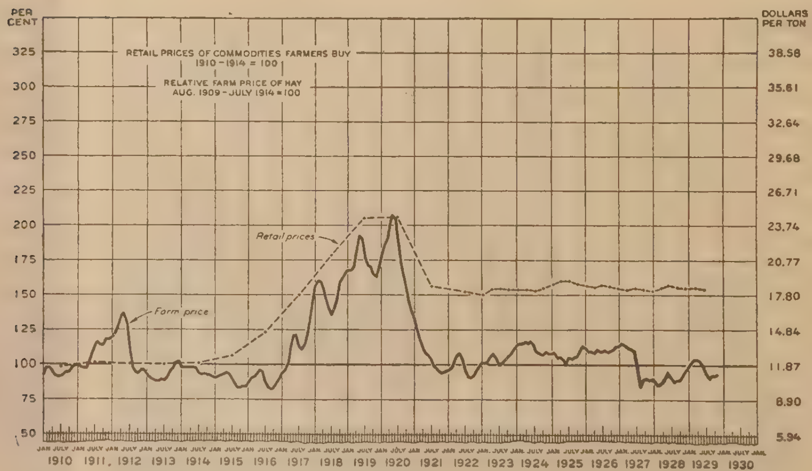

FIGURE 6.—FARM PRICES OF HAY AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The prices of hay have been practically at pre-war levels since 1921, largely because of the decline in the number of horses in the United States in recent years. From year to year the price of hay is influenced largely by the variations in the size of the crop and by the supply of other feeds. In most seasons there is a definite tendency for hay prices in the winter and spring months to average higher than in the late summer months of abundant hay supplies

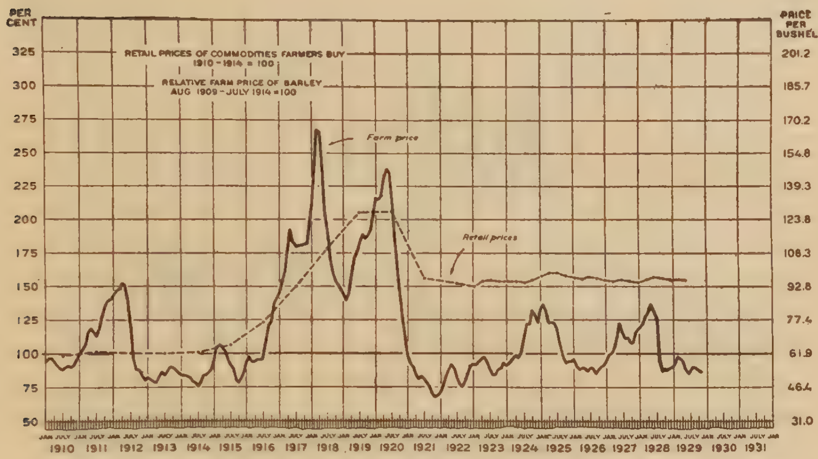

FIGURE 7.—FARM PRICES OF BARLEY AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Farm prices of barley rose during the war but since then have fallen to the pre-war level while retail prices of things farmers buy have averaged about half again as high since 1921 as they were before the war

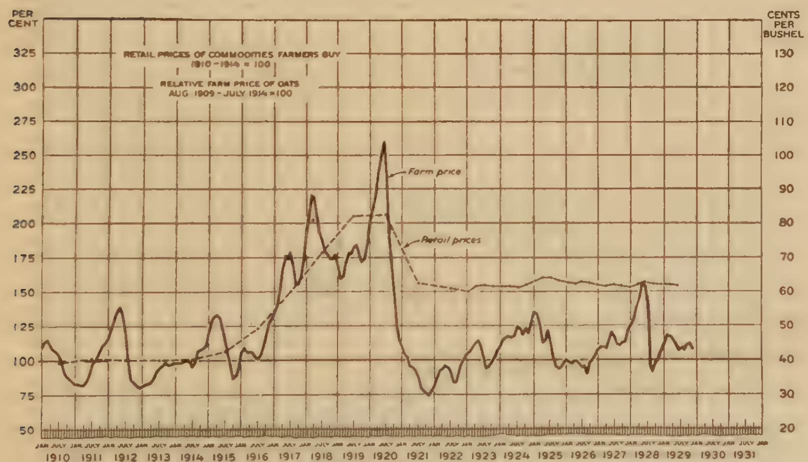

FIGURE 8.—FARM PRICES OF OATS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The farm price of oats rose during the war about as much as retail prices, but since 1920 oats prices have averaged but little above the pre-war levels while prices of things farmers buy have been about half again as high as before the war. Year-to-year variations in oats prices are dependent largely upon the size of the crops of oats and other feed grains

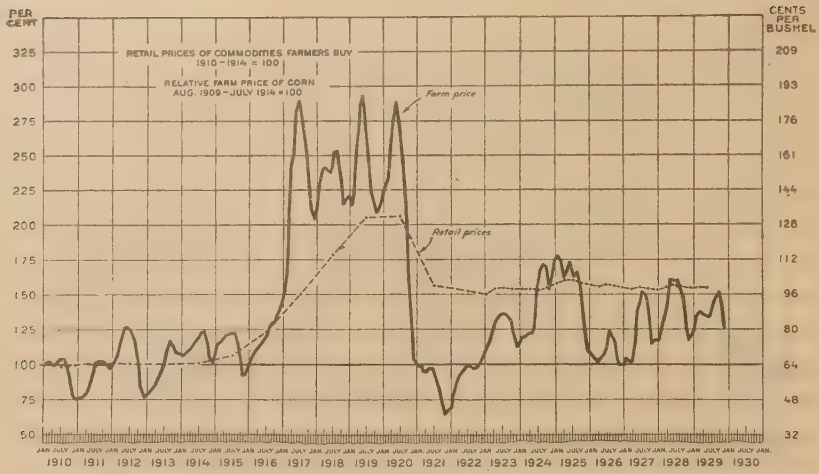

FIGURE 9.—FARM PRICES OF CORN AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Farm prices of corn rose more during the war, but they fell much more in 1920 and 1921 and even during the past few years have not averaged as high as the prices of things farmers buy. Year-to-year variations are mostly due to differences in the size of the crop and to changes in the feeding demand

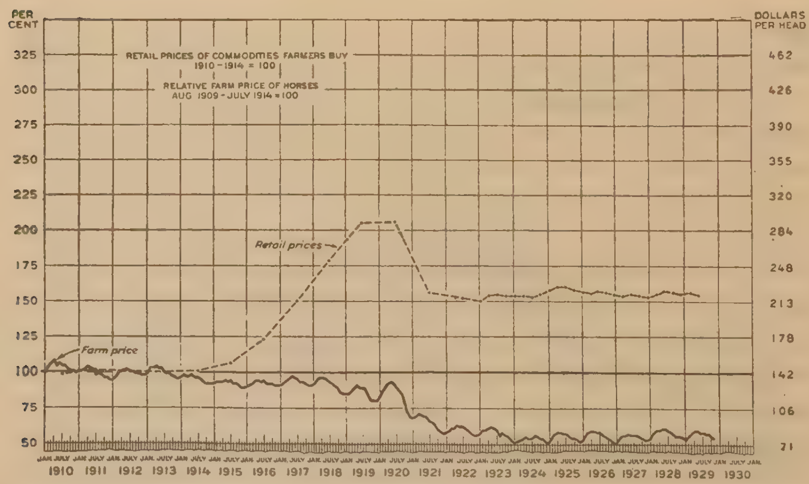

FIGURE 10.—FARM PRICES OF HORSES AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The price of horses is practically the only one among agricultural prices which failed to show the general commodity advances in the war years of 1917–1919. They declined as did all other prices in 1921 and have since remained on a fairly stable but low level. The downward trend in horse prices in recent years is due largely to the decreased demand brought about by the increased use of trucks and tractors and other farm machinery

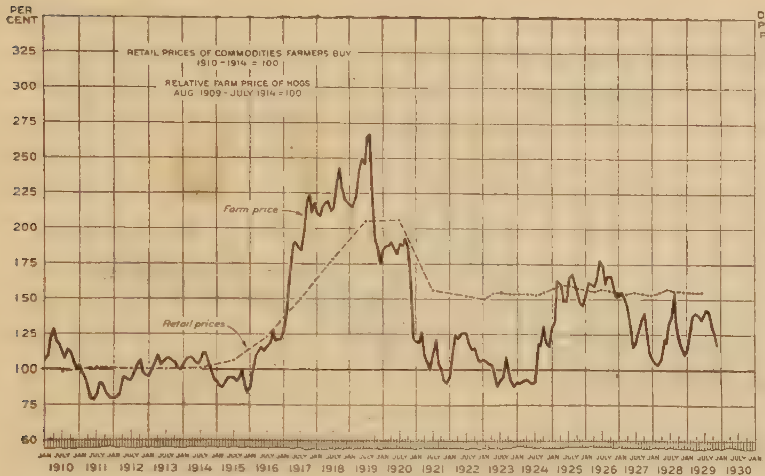

FIGURE 11.—FARM PRICES OF HOGS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Hog prices vary greatly from year to year. Periods of low prices are followed by periods of high prices, to be followed again by low prices. These swings in prices were increased by war inflation and postwar deflation. In the war period prices were considerably above the level of prices paid by farmers for what they buy, fell far below after the war, and recovered to that level only in the years 1925 and 1926

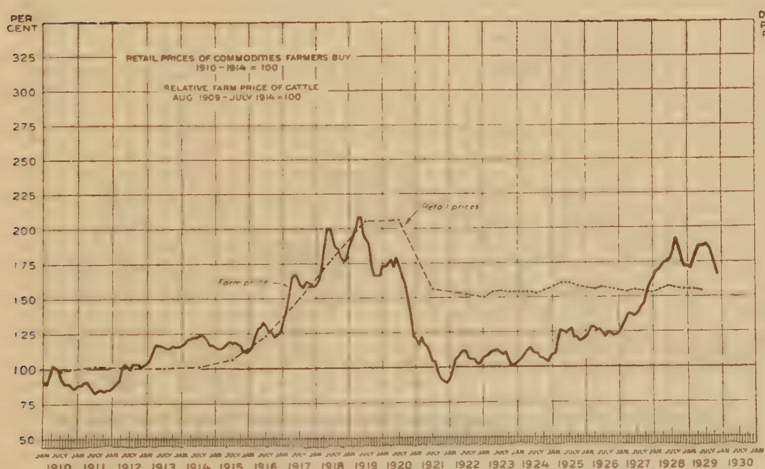

FIGURE 12.—FARM PRICES OF CATTLE AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Cattle prices do not fluctuate as much as hog prices. Beginning in 1913, cattle prices rose more rapidly than the prices of what the farmer buys but fell much more rapidly during the period 1919-1921. This rise and fall, as we shall see later, was due both to inflation and deflation of prices in general and also to changes in production. The upward trend from 1921 to 1928 was due largely to reductions in quantities available for market and improvement in demand for dairy products

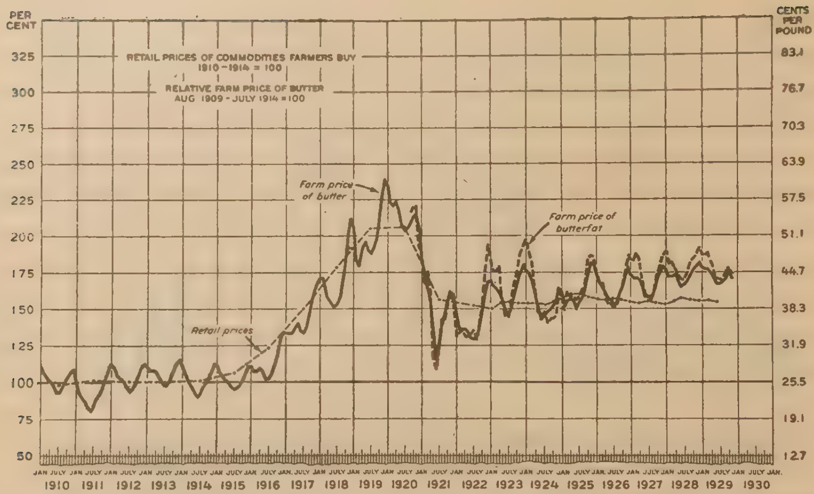

FIGURE 13.—FARM PRICES OF BUTTER AND BUTTERFAT AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Since 1921 the farm price of butter and butterfat have both risen relative to the index of retail prices of commodities which farmers buy. Farm prices of butterfat show a wider seasonal fluctuation than farm prices of butter

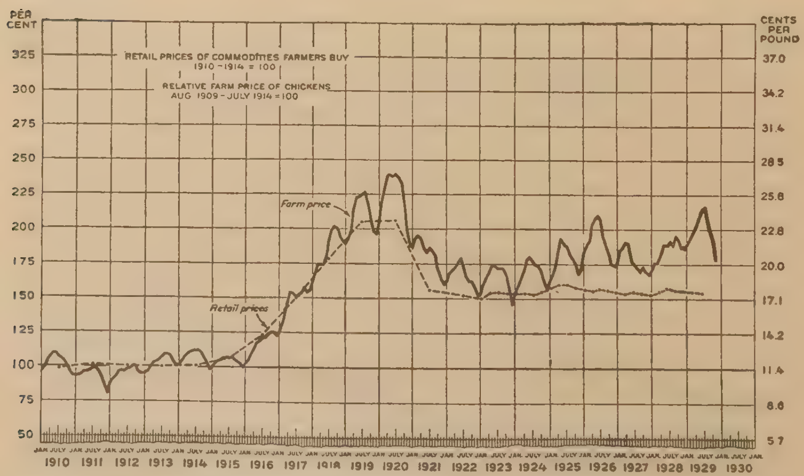

FIGURE 14.—FARM PRICES OF CHICKENS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

During the past 20 years the farm price of chickens has gradually risen above the index of retail prices of commodities farmers buy, the largest part of this rise occurring since 1923. Compared with the prices the farmer has paid for the goods he buys, the prices he has received during the last five years are higher than at any other time in his period

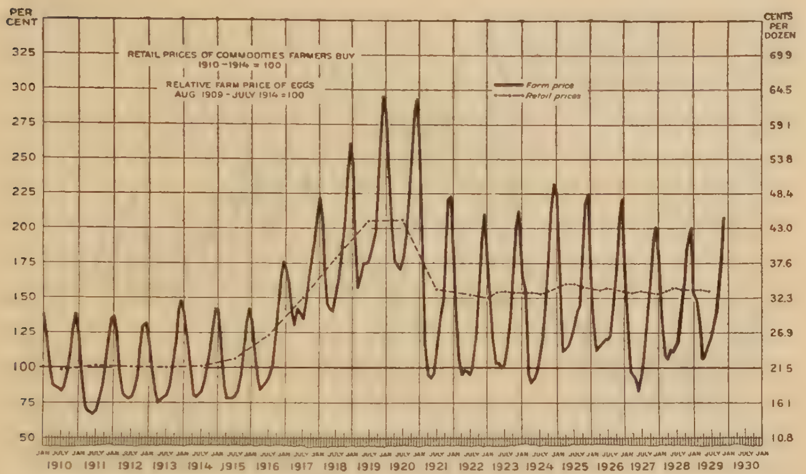

FIGURE 15.—FARM PRICES OF EGGS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The farm price of eggs varies widely with the season. Since 1910 there has been little change in the annual average price when compared with the index of retail prices of commodities farmers buy. Due to the greater seasonal changes in the last 10 years, however, the peak fall and winter price has been higher than before when compared with this index and the low spring price has been lower. Most of the farmer's eggs are marketed during this low price season

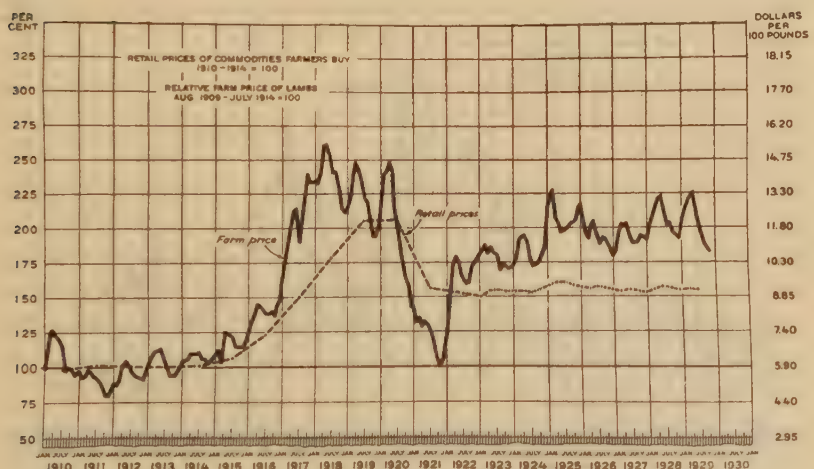

FIGURE 16.—FARM PRICES OF LAMBS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Lamb prices rose higher and fell lower during the war than prices of commodities farmers buy. Since 1922 lamb prices have been higher than the prices of these commodities as compared to their relationship before the war

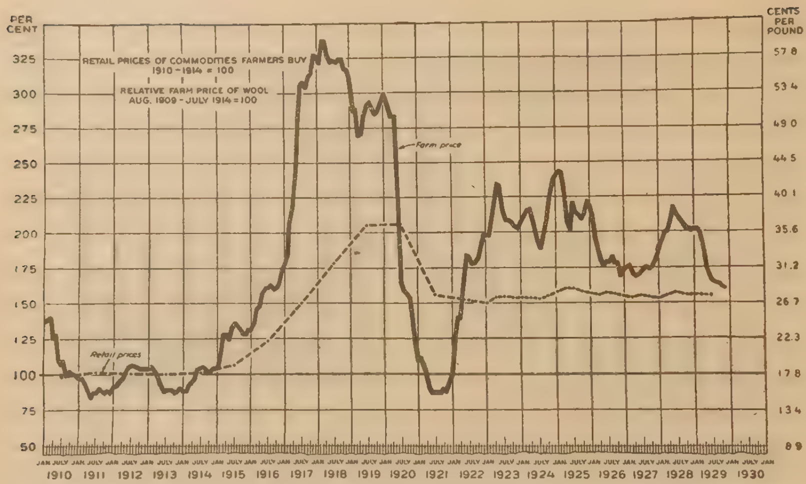

FIGURE 17.—FARM PRICES OF WOOL AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Between 1910 and 1915 world sheep numbers reached a high level and wool prices were low. Smaller supplies, a rising all-commodity price level, and the war demand resulted in high wool prices between 1915 and 1920. The low prices of 1921 were followed by a sharp decline in world wool production and a recovery in wool prices. Since 1924 world sheep numbers have been increasing and wool prices have again had a downward trend

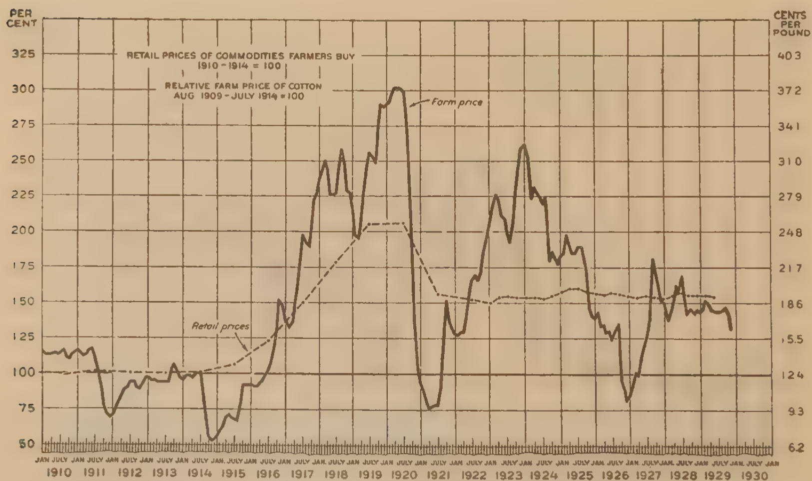

FIGURE 18.—FARM PRICES OF COTTON AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Large cotton crops in 1911 and 1914 reduced the purchasing power of cotton in those years. Small crops and strong domestic demand caused the purchasing power to improve quite steadily from 1914 to 1920. The large supplies of cotton and world-wide depression caused prices to fall rapidly in late 1920 and 1921. The very short crops of 1921, 1922, and 1923, together with improving world-demand conditions, resulted in a very rapid rise, and purchasing power reached the highest levels since the Civil War. These high prices were followed by increased production until checked by the record crop and low prices of 1926

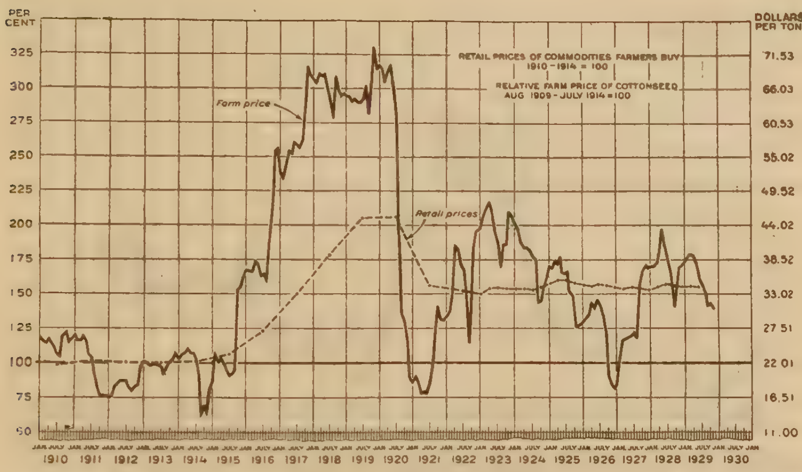

FIGURE 19.—FARM PRICES OF COTTONSEED AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

Cottonseed prices have many of the characteristics of cotton-lint prices. The carry-over from year to year is of comparatively less importance in cottonseed, however, so that its price is more closely associated with the size of the cotton crop for each individual year. Also, cottonseed and its products are less dependent upon foreign markets and its prices are affected by the demand for seed and oil

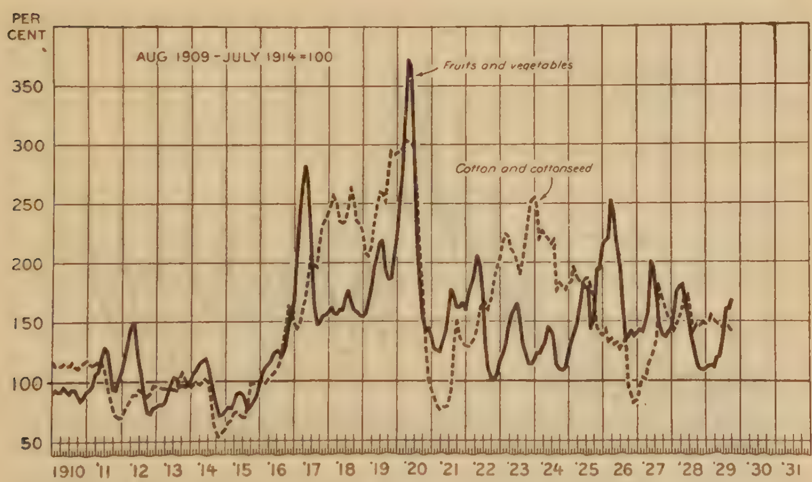

FIGURE 20.—RELATIVE FARM PRICES OF FRUITS AND VEGETABLES AND COTTON AND COTTONSEED, JANUARY, 1910, TO DATE

In this figure the price variations of cotton and cottonseed (shown in figs. 18 and 19) have been combined into one series of relative farm prices, the prices of the 1909–1913 crops being taken as 100 per cent. Similarly the prices of apples, potatoes (see figs. 3 and 4), and several other items, such as sweetpotatoes, beans, oranges, and grapefruit, have been combined into one series of relative farm prices. Potato and apple prices are the most important ones in this group

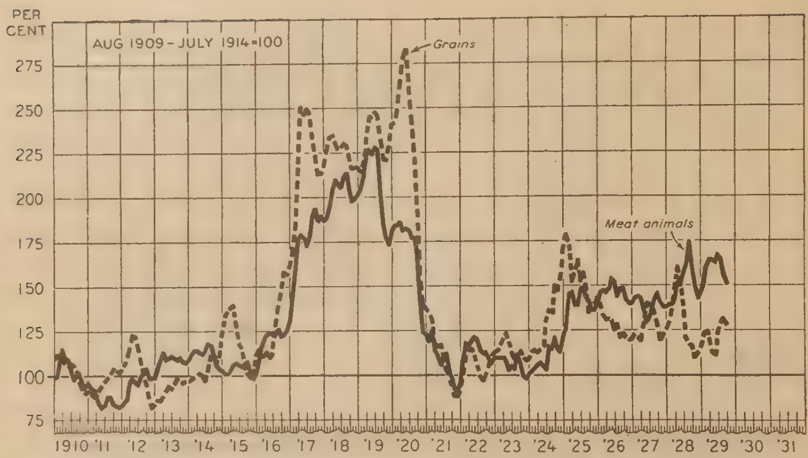

FIGURE 21.—RELATIVE FARM PRICES OF MEAT ANIMALS AND GRAINS, JANUARY, 1910, TO DATE

Prices of grains rose higher during the war period than the prices of meat animals. The prices of these two groups of commodities tend to follow the same general level, but since the middle of 1928 prices of meat animals have been higher than the prices of grains as compared to pre-war relationship

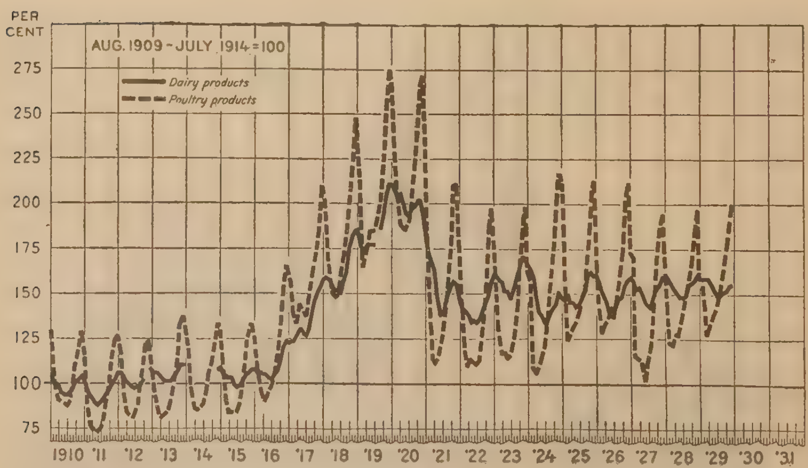

FIGURE 22.—RELATIVE FARM PRICES OF DAIRY AND POULTRY PRODUCTS, JANUARY, 1910, TO DATE

The farm prices of dairy and poultry products have remained in about the same relation to each other since 1910 except during the period 1916–1920, when prices of poultry products rose more than did those of dairy products. The seasonal variation in poultry prices is much greater than in dairy prices

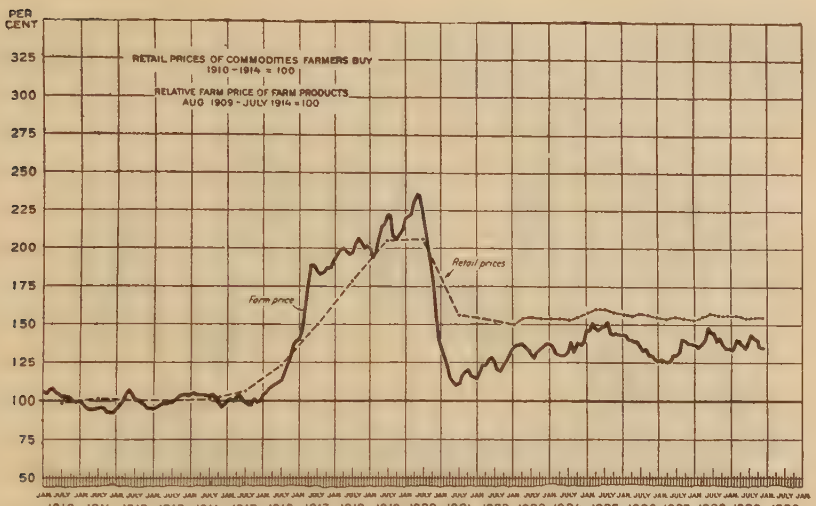

FIGURE 23.—FARM PRICES OF FARM PRODUCTS AND INDEX OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The index number of farm prices includes an average of the prices of 30 commodities through 1925, and since then 27 commodities. In the period 1917–1920 farm prices rose more than the prices farmers pay but in 1920 and 1921 fell much farther. Since 1921 the trend of prices of farm products has been upward, with retail prices remaining about on the same level, thereby increasing the purchasing power per unit of farm products

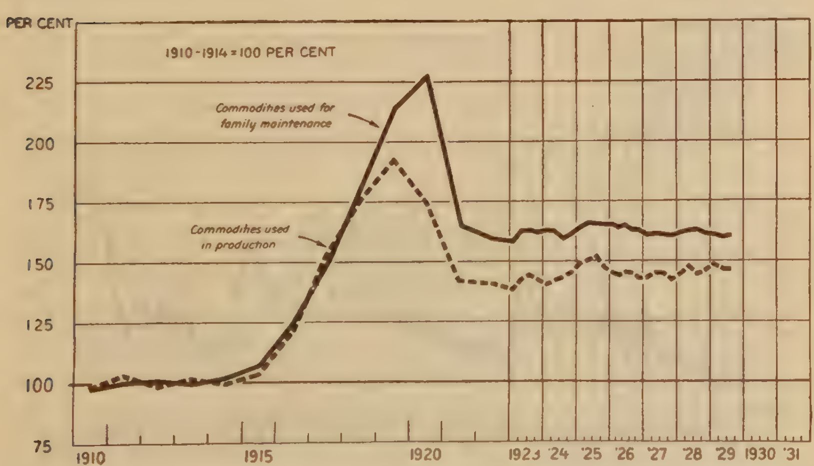

FIGURE 24.—INDEX NUMBERS OF RETAIL PRICES OF COMMODITIES FARMERS BUY

The commodities used in production include seed, feed, machinery, fertilizer, and building materials. The commodities used in family maintenance include food, clothing, furniture, and furnishings, building materials, and operating expenses for the house. It is of interest to note that since 1919 the prices of commodities used in production have been lower relatively than the prices of commodities for the family living. This is largely due to the continuation of high prices for clothing, furniture, and furnishings

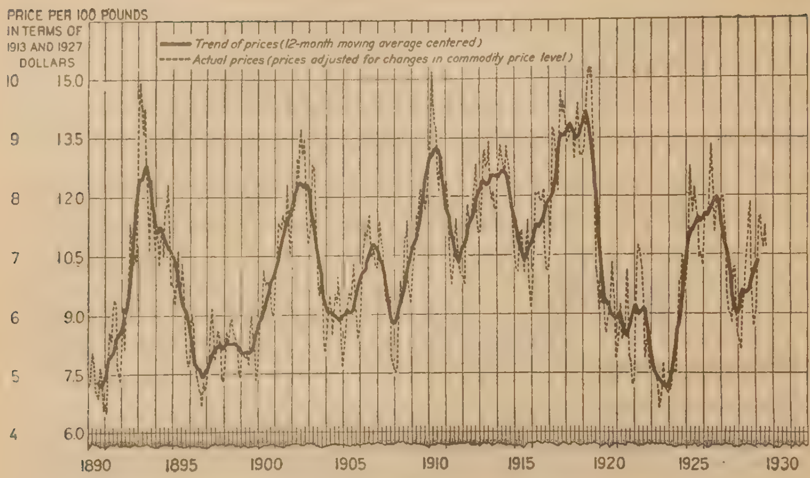

FIGURE 25.—PRICES OF HEAVY HOGS AT CHICAGO, 1890–1929

Since 1890 hog prices, adjusted for changes in the general price level, have moved in cycles varying in length from three to six years. During these years there has been a tendency for every other cycle to be a large one and for the intermediate cycle to be less marked. These cycles are caused by changes in production. When corn prices are low and hog prices high, farmers plan to produce too many hogs, and prices soon drop to lower levels. Then production is reduced and prices rise

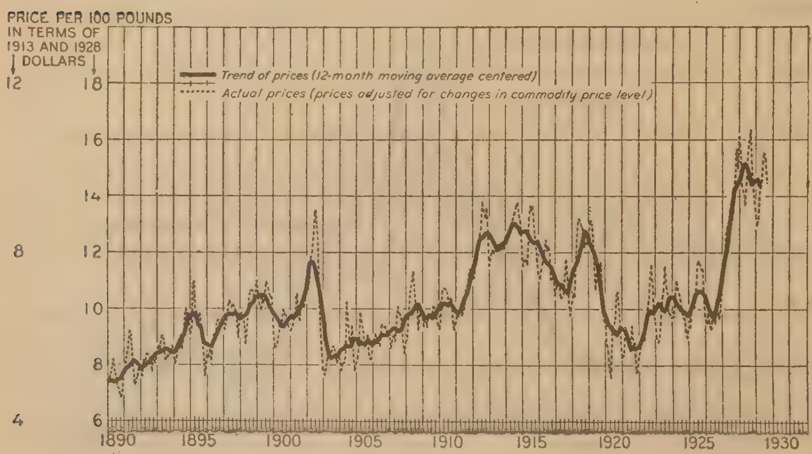

FIGURE 26.—PRICES OF BEEF STEERS AT CHICAGO, 1890–1929

The beef-cattle cycle is longer than the hog cycle. This figure shows only one complete cycle, 1893–1920. The beef-cattle cycle is usually about 16 years in length. Prices are now near the peak of a cycle. Production is beginning to increase and prices will decline. An upward trend in prices from 1890 to date suggests that prices may not fall to a level so low as in 1890, 1903, or 1920

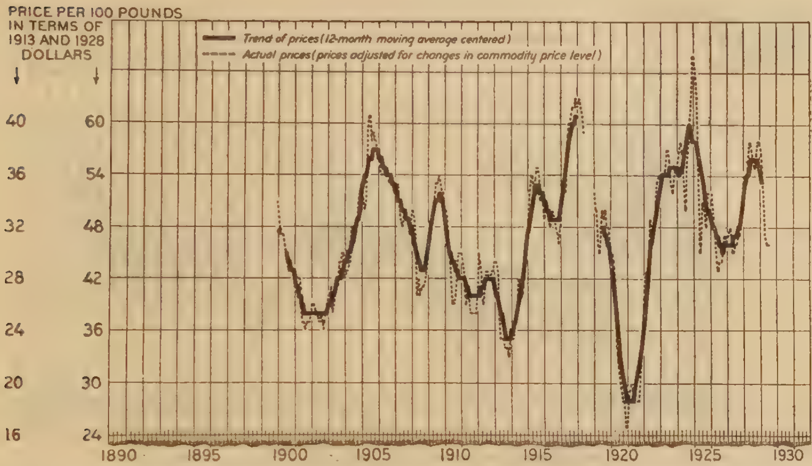

FIGURE 27.—PRICES OF WOOL AT BOSTON, 1900–1929

When domestic wool prices are adjusted for changes in the all-commodity price level, their relationship to the cycle of world sheep numbers is clear. These cycles last for several years. Shorter variations lasting for a year or so are due to the effect of climatic conditions on sheep losses and fleece yields and to demand conditions

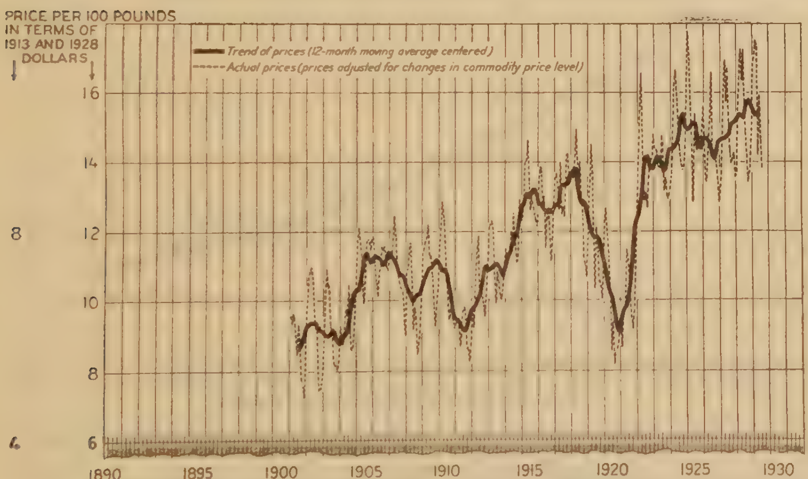

FIGURE 28.—PRICES OF LAMBS AT CHICAGO, 1901–1929

Lamb prices adjusted for changes in the general price level tend to move in cycles. The first cycle shown here extended over a period of eight years and the second one over a period of nine years. The length of the present cycle apparently has been extended by prices remaining at a high level since 1922. This may be attributed to an increase in the demand for lamb and mutton during these years

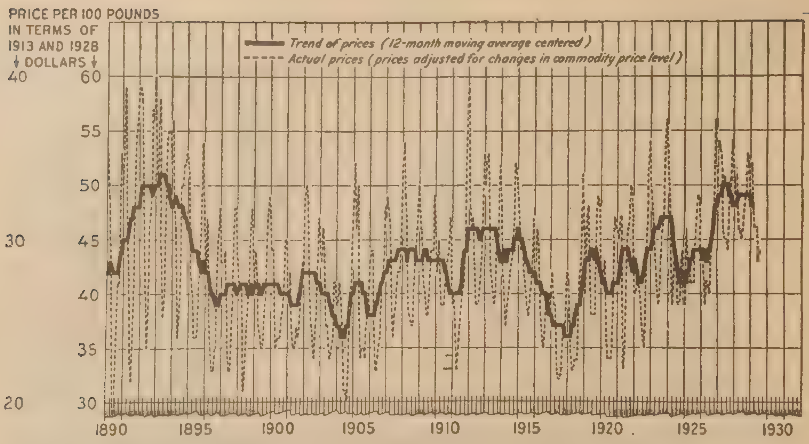

FIGURE 29.—PRICES OF BUTTER AT NEW YORK, 1890–1929

The 12-month moving average of the prices of 92-score butter at New York, adjusted for changes in the commodity price level, shows alternate periods of high and low prices. High points occurred in 1893, 1912, and 1927. Low points were reached in 1904 and 1917. In addition to these long fluctuations of prices there have been shorter swings of about seven years between the low points

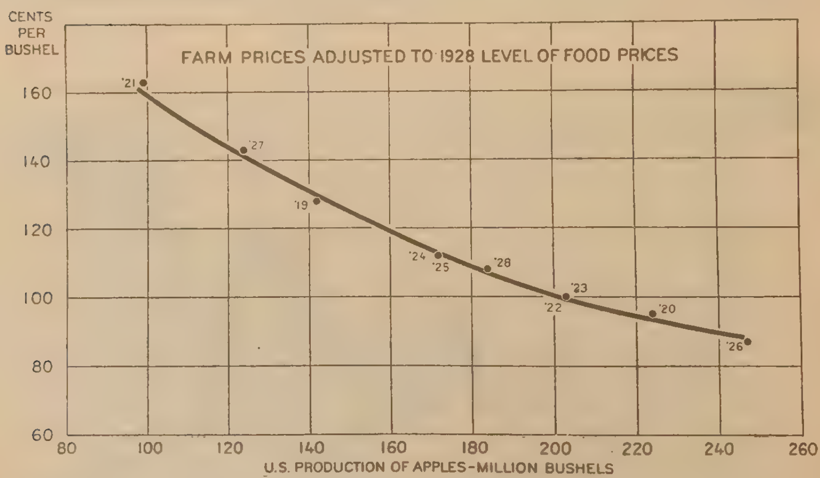

FIGURE 30.—APPLES: RELATION BETWEEN TOTAL PRODUCTION AND UNITED STATES FARM PRICE, 1919–1928

The most important single factor in the yearly variations in the price of apples received by growers is the variation in the size of the crop throughout the United States. In the 10 years 1919–1928 the relation between production and price has been such that a crop of around 100 million bushels brought an average price of $1.60 per bushel, while a crop of 200 million bushels brought an average price of about $1, indicating that the value of the larger crop (about $200,000,000) was *greater* than the value of the smaller crop ($160,000,000)

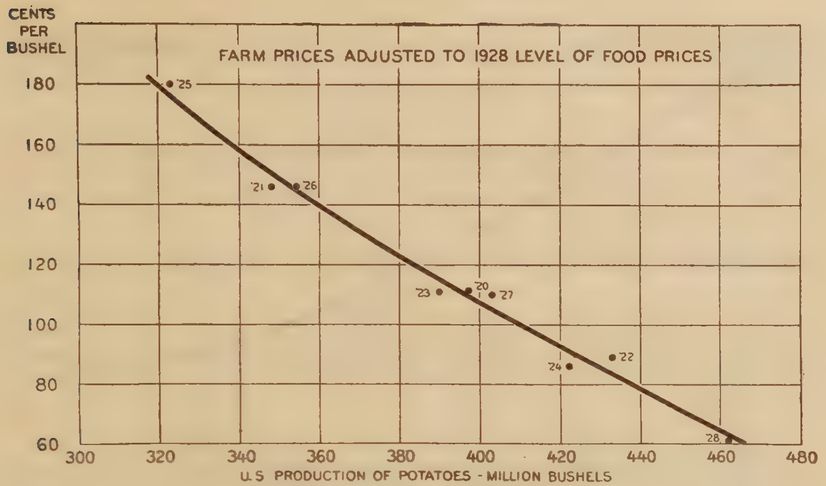

FIGURE 31.—POTATOES: RELATION BETWEEN TOTAL PRODUCTION AND UNITED STATES FARM PRICE, 1920–1928

The most important single factor in the yearly variations in the farm price of potatoes in the past 9 years has been the variation in the size of the crop in the United States. The relation between production and price has been such that a small crop of around 320 million bushels brought a price of around $1.80 per bushel, while a large crop of 440 million bushels brought a price of around 80 cents, indicating that the value of the large crop (valued at $352,000,000) was considerably *smaller* than that of the smaller crop (valued at $576,000,000)

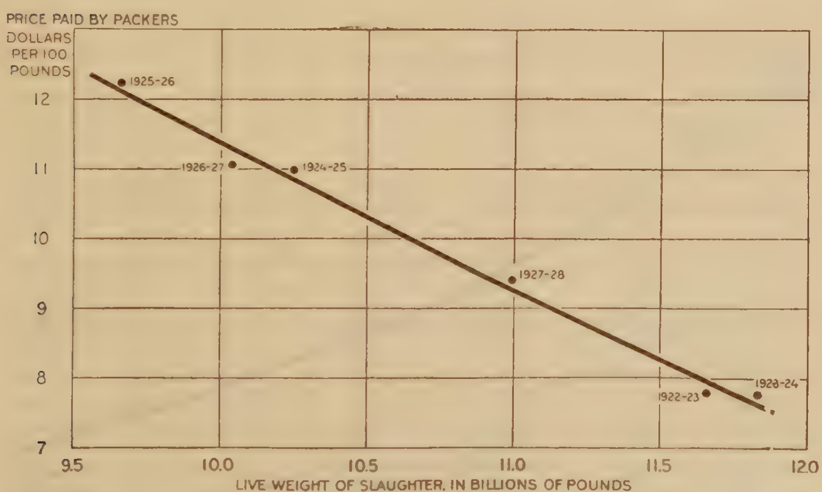

FIGURE 32.—HOGS: RELATION BETWEEN PRICE AND TOTAL LIVE WEIGHT OF SLAUGHTER UNDER FEDERAL INSPECTION, 1922–23 TO 1927–28. PRICES FOR YEAR FROM NOVEMBER THROUGH OCTOBER ADJUSTED TO 1928 PRICE LEVELS

The greater the total live weight of hogs slaughtered during the marketing years from 1922–23 to 1927–28 the less the price per hundred pounds paid by packers. Also, the greater the total live weight of hogs slaughtered the less their total value. On the 1928 price level, 10 billion pounds would sell for about 11.3 cents per pound, but 11 billion pounds would bring only about 9.3 cents per pound

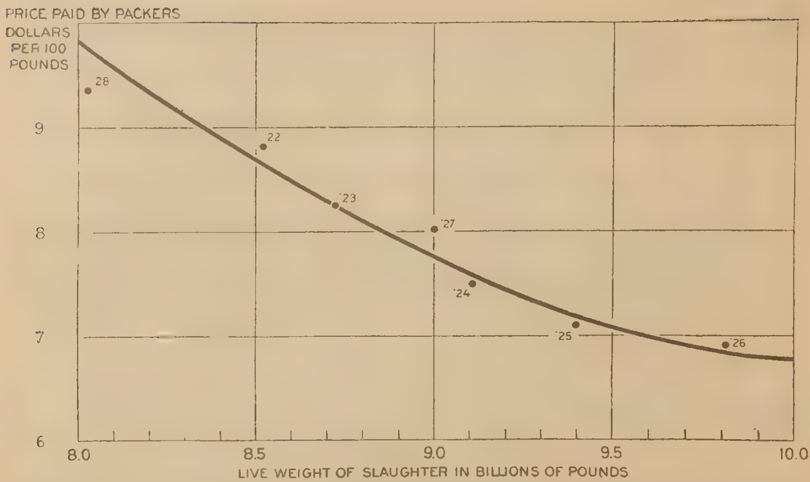

FIGURE 33.—BEEF CATTLE: RELATION BETWEEN PRICE AND TOTAL LIVE WEIGHT OF SLAUGHTER UNDER FEDERAL INSPECTION, 1922–1928. PRICES FOR CALENDAR YEAR ADJUSTED FOR TREND AND 1928 PRICE LEVEL

After removing the influence of what appears to have been a fairly regular increase in demand during the period 1922–1928, the above relationship exists between total live weight of cattle slaughtered and price per hundred pounds paid by packers, with a level of demand approximately that existing in 1925

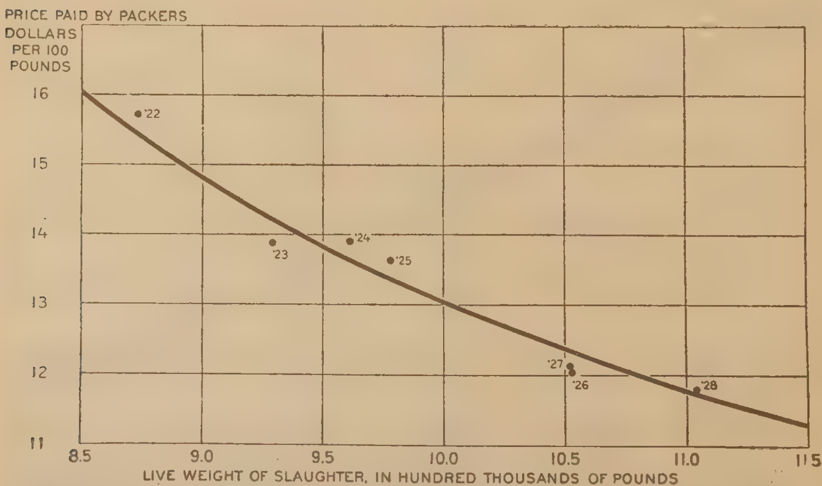

FIGURE 34.—SHEEP: RELATION BETWEEN PRICE AND TOTAL LIVE WEIGHT OF SLAUGHTER UNDER FEDERAL INSPECTION, 1922–1928. PRICES FOR CALENDAR YEAR ADJUSTED FOR TREND AND 1928 PRICE LEVEL

After removing the influence of an apparent increase in demand, a fairly close relationship exists between total live weight of sheep slaughtered and price paid by packers during the years 1922 to 1928. In the construction of this curve demand is held constant at a level approximately the average of that existing in 1924 and 1925

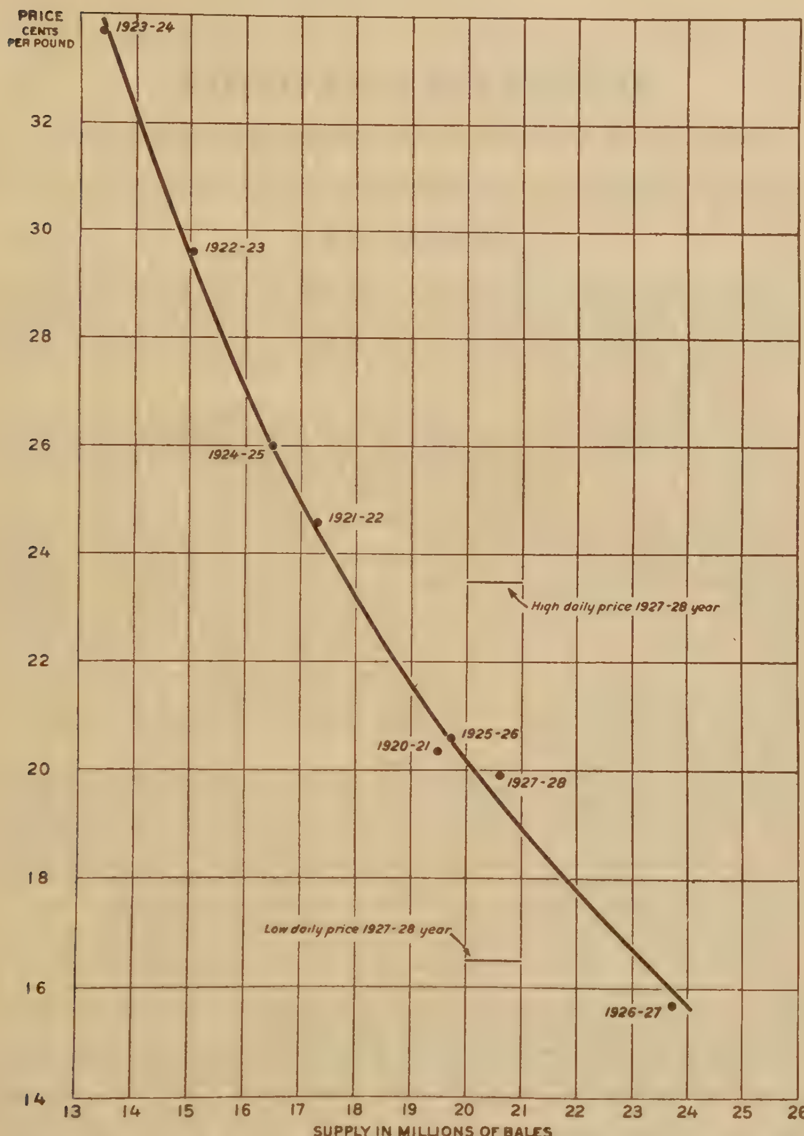

FIGURE 35.—AVERAGE RELATIONSHIP BETWEEN WORLD SUPPLIES OF AMERICAN COTTON AND NEW ORLEANS YEARLY PRICE ADJUSTED TO 1927–28 TREND AND PRICE LEVEL

The level of cotton prices each season is determined in large part by the total supply of American cotton, as shown by the accompanying figure giving seasonal supplies and average prices adjusted to the all-commodity price level and to the demand conditions of 1927–28. That prices fluctuate widely from this level is shown by the distance between the lines indicating the high and low prices for the 1927–28 season

AGRICULTURE STATISTICS

UNITED STATES DEPARTMENT OF AGRICULTURE YEARBOOK, 1930

Prepared under the direction of the Statistical Committee: O. C. Stine, chairman, Lewis B. Flohr, secretary, J. A. Becker, S. W. Mendum, C. A. Burmeister, and L. M. Davis.

INTRODUCTION

The statistical section of this Yearbook brings together in one place what seems from experience to be the most important agricultural statistics for the United States, and for the world so far as the agriculture of this country is concerned. Historical and geographical series have been given as far as material permitted. These are basic data helpful to the producer in his problems of production and marketing of agricultural commodities.

For greater detail on individual commodities than can be shown in the Yearbook, Statistical Bulletin series of the department may be consulted.

For current statistics to supplement the Yearbook statistics the following sources should be used: (1) Crops and Markets—a monthly publication of the department carrying the latest current statistics available on agriculture in the United States; (2) Foreign Crops and Markets—issued weekly by the Bureau of Agricultural Economics and devoted to current world statistics of crops, livestock, and markets; (3) Foreign Commodity News—published by the Bureau of Agricultural Economics and showing the latest world information on single commodities and released as important information is received; (4) market news reports of the Bureau of Agricultural Economics—issued daily, weekly, monthly, quarterly, or at irregular intervals, at Washington and the principal markets.

Statistical data from the following bureaus are included: Weather Bureau, Bureau of Animal Industry, Forest Service, Bureau of Public Roads, Bureau of Agricultural Economics, Bureau of Dairy Industry, Extension Service, and Grain Futures Administration.

The Federal market news system supplies much price and market information presented here. The leased-wire system in use by the service extends from the Atlantic to the Pacific and reaches most of the important markets of the country. At each of the branch offices commodity specialists gather information regarding the supply, the demand, and prices for the products on which they report. They observe the sales actually made on the markets and are constantly in touch with the traders who in many instances give them access to their office records in order that they may have specific information on which to base their reports.

The fruits and vegetables market news service covers car-lot shipments, car-lot unloads, and prices. Car-lot shipments are reported by officials and agents of railroads, express companies, and boat lines. Car-lot unloads information is obtained by representatives of the bureau in the larger markets of the country from railroad, express company, and boat-line officials.

The dairy and poultry service obtains the statistics of receipts from reports by the railroads and by receivers of truck receipts made daily direct to the Bureau of Agricultural Economics, through its local offices in the cities concerned. Current storage stocks of dairy and poultry products are obtained directly by telegraph from all important storage warehouses. Prices reported at terminal markets are obtained by personal interview of employees of the bureau with buyers and sellers, and represent the majority of sales reported.

The market news service on livestock, meats, and wool receives statistics of receipts, slaughter, and shipment of livestock from monthly reports submitted by the public stockyards. Its price reports are based on information gathered by bureau reporters in the large markets who observe trade conditions, discuss the market with buyers and sellers, and on the basis of all information they gather quote a daily range of prices for individual grades or groups of grades.

The grain, hay, feed, and seed market news reports are based on current information from reporters in the leading markets.

The statistics of grain grading are based on work done by licensed grain inspectors located throughout the United States.

The crop and livestock reporting service estimates acreage, condition of crop, yield per acre, production, and prices of crops, and numbers, prices, and values of livestock. The organization of this work outside of the crop-reporting board and the office force in Washington consists of 41 State field officers, with an agricultural statistician in charge. There is one field office for the New England States, one for Maryland and Delaware, and one for Utah and Nevada. There is a dual system of agricultural correspondents and reporters distributed over the country. One group sends its reports to the local State field office and the other group directly to the Bureau in Washington.

Acreages for the year 1909 are as reported by the Bureau of the Census; acreages in 1919 and 1924 are based upon the census (preliminary for 1924 in some States), supplemented by State enumerations. In the intercensal years, from 1911 to 1915, estimated acreages were obtained by applying estimated percentages of decrease or increase to the published acreage in the preceding year. The estimates from 1915 to 1918, from 1919 to 1923, and from 1925 to 1929 are based upon acreage changes from year to year as shown by a sample of approximately 2 per cent of the crop acreages in each year, supplemented by State enumerations. Yields per acre are estimates based upon reports of one or more farmers in each agricultural township on the average yield per acre in their localities. Production is acreage times yield per acre.

Estimates of farm stocks, shipments, quality, crop condition, and miscellaneous information concerning crops are based either upon sample data or upon estimates of crop reporters for their localities. The sources of these data are indicated in the notes accompanying the tables.

Monthly estimated prices received by producers on the specified dates are based upon reports from special price reporters, who are mostly country dealers, on the average price paid to farmers and do not relate to any specified grade.

Farm value as shown is computed by applying the December 1 farm price to the total production. (The prices are reported by the crop reporters, who are mostly farmers.) The average price received for the portion of the crop sold may be greater or less than this price, depending upon the prices previous and subsequent to December 1 and the amount of the crop sold at the different prices.

Numbers of livestock on farms on January 1, 1920 and 1925, are based upon the census enumeration as of that date, supplemented by enumerations by State agencies, such as assessors and brand inspection boards, and by records of shipments during 1920 and 1925. In the intercensal years, from 1911 to 1916, the numbers of livestock were obtained by methods identical with those used for crop acreages. Estimates from 1917 to 1919, from 1920 to 1923, and from 1926 to 1929 are based upon a sample of approximately 2 per cent, supplemented by trends derived from assessors' enumerations, reports of brand inspection boards, market movements, and stockyard receipts. The census bases are not always comparable from one decade to another, because of changes of dates and classifications.

The average value per head on January 1 is estimated from reports of correspondents relating to livestock in their vicinity. These tend to reflect inventory values as distinguished from the monthly prices which relate to sales. The farm value on January 1 is computed by applying the average value per head to the number of head on farms.

Where a weighting factor was available market prices as shown are weighted averages, but in many cases a weighting factor was not available, and the prices shown are usually the means of ranges of quotations without reference to quantity. The weighted price of wheat in Chicago is based on the number of carload sales reported, which range from 42 to 55 per cent of all receipts on that market. The weighted average price of hogs at Chicago is based on total sales of butcher and packer hogs to slaughterers.

Prices derived from different sources may not be strictly comparable, although for most general purposes they are satisfactory. The changes in the grade and weight groupings of many kinds of livestock which were made July 1, 1925, while not affecting certain price series, made others only fairly comparable and made comparison impossible in other cases. The data as to commercial stocks and movements of various commodities are as nearly complete as practicable and feasible, and are considered fairly representative.

Statistics of acreage and production in foreign countries are compiled as far as possible from official sources and are therefore subject to whatever errors may result from shortcomings in the reporting and statistical services of the various countries. Inaccuracies also result from differences in nomenclature and classification in foreign countries. Except where otherwise stated, pre-war data refer to

pre-war boundaries. Yields per acre are calculated from acreage and production, both rounded to thousand units, and are therefore subject to a greater possibility of error when calculated for countries with small acreage.

The tables of international trade cover substantially the international trade of the world. The total imports and the total exports in any one year can not be expected to balance, although disagreements tend to be compensated over a series of years. Among the sources of disagreement are: The different periods covered by the "year" of various countries; imports received in the year subsequent to the year of export; lack of uniformity in classification of goods as among countries; different trade practices and varying degrees of failure in recording countries of origin and ultimate destination; different practices in recording reexported goods; and different methods of treating free ports. The exports given are domestic exports and the imports given are imports for consumption, whenever it is possible to distinguish such imports from general imports. While there are some inevitable omissions, there may be some duplication because of reshipments which do not appear as such in the official reports. In the trade tables, figures for the United States include Alaska, Porto Rico, and Hawaii, but not the Philippine Islands.

As an aid to the comprehension and use of these statistics, the following table of weights, measures, and conversion factors will be useful:

Weights, measures, and conversion factors used in the Department of Agriculture

Commodity	Unit [1]	Weight in pounds	Commodity	Unit [1]	Weight in pounds
Alfalfa seed	Bushel	60	Lemons	Box	[2] 74
Almonds	Short ton	2,000	Milk	Gallon	8.6
Apricots	do	2,000	Oats	Bushel	32
Do	Bushel	48	Oranges (Calif.)	Box	[2] 70
Asparagus	Short ton	2,000	Oranges (Fla.)	do	[2] 80
Barley	Bushel	48	Orchard grass	Bushel	14
Beans, snap	Short ton	2,000	Peanut oil	Gallon	7.5
Beans, dry	Bushel	60	Plums	Short ton	2,000
Beet sugar	Short ton	2,000	Potatoes	Bushel	60
Broomcorn	do	2,000	Prunes	Short ton	2,000
Buckwheat	Bushel	48	Rapeseed	Bushel	50
Cabbage	Short ton	2,000	Raisins	Short ton	2,000
Cane sugar	do	2,000	Rice, rough	Bushel	45
Clover seed	Bushel	60	Rice, cleaned	do	60
Corn, shelled	do	56	Rye	do	56
Corn, ear, husked	do	70	Rye flour	Barrel	196
Cottonseed	Short ton	2,000	Soy-bean oil	Gallon	7.5
Cotton, ginned	Bale	[2] 478 [3] 500	Spelt	Bushel	40
			Sugar	Short ton	2,000
Cottonseed oil	Gallon	7.5	Sugar beets	do	2,000
Flaxseed	Bushel	56	Sugar cane	do	2,000
Figs	Short ton	2,000	Timothy seed	Bushel	45
Grapefruit	Box	[2] 70	Tomatoes	do	56
Grapes	Short ton	2,000	Wheat	do	60
Hay	do	2,000	Wheat flour	Barrel	196
Hemp seed	Bushel	44	Walnuts	Short ton	2,000

Commodity	Equivalents
Almonds	1 pound shelled is equivalent to about 3⅓ pounds unshelled.
Apples	1 pound dried is equivalent to about 5 pounds of fresh.
Barley flour	1 barrel (196 pounds) is equivalent to about 9 bushels of barley.
Buckwheat flour	1 barrel (196 pounds) is equivalent to about 7 bushels of buckwheat.
Filberts	1 pound shelled is equivalent to about 2.22 pounds unshelled.
Malt	1.1 bushel (34 pounds) is equivalent to about 1 bushel of barley.
Oatmeal	1 barrel (196 pounds) is equivalent to about 10⅝ bushels of oats.
Do	18 pounds is equivalent to about 1 bushel of oats.
Peanuts	1 pound shelled is equivalent to about 1½ pounds unshelled.
Peaches (Calif.)	1 pound dried is equivalent to about 5½ pounds fresh.
Prunes	1 pound dried is equivalent to about 2½ pounds fresh.
Rye flour	1 barrel (196 pounds) is equivalent to about 6 bushels of rye.
Raisins	1 pound is equivalent to about 4 pounds of grapes.
Wheat flour	1 barrel (196 pounds) is equivalent to about 4.7 bushels of wheat.[4]
Walnuts (English)	1 pound shelled is equivalent to about 2.38 pounds unshelled.

[1] Standard bushel used in the United States contains 2,150.42 cubic inches; the gallon, 231 cubic inches.
[2] Net.
[3] Gross.
[4] Due to changes in milling processes equivalents have varied as follows: 1790–1879, 5; 1880–1908, 4.75; 1909–1917, 4.7; 1918–1919, 4.5; 1920, 4.6; 1921–1927, 4.7.

STATISTICS OF GRAINS

TABLE 1.—*Wheat: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1929*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Spring wheat, price per bushel at Chicago, year beginning July 1[1]	No. 2 red winter wheat, price per bushel at Chicago, year beginning July 1[2]	Foreign trade, including flour, year beginning July 1[3]: Domestic exports[4]	Foreign trade: Imports[5]	Net exports[6]: Total	Net exports[6]: Percentage of production
	1,000 acres	*Bush.*	*1,000 bush.*	*Cts.*	*1,000 dolls.*	*Cts.*	*Cts.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Per cent*
1849			*100, 486*			66		7, 536	2, 913	5, 701	5. 7
1859			*173, 105*			90	82	17, 213	[7] 4, 493	[7] 12, 720	7. 3
1866	15, 424	9. 9	152, 000	152. 7	232, 110	219	94	12, 647	3, 093	10, 828	7. 1
1867	18, 322	11. 6	212, 441	145. 2	308, 387	198	145	26, 323	2, 014	24, 550	11. 6
1868	18, 460	12. 1	224, 037	108. 5	243, 033	134	123	29, 717	1, 830	28, 314	12. 6
1869			*287, 746*								
1869	19, 181	13. 6	260, 147	76. 5	199, 025	98	84	53, 901	1, 286	53, 126	20. 4
1870	18, 993	12. 4	235, 885	94. 4	222, 767	116	84	52, 574	867	52, 195	22. 1
1871	19, 944	11. 6	230, 722	114. 5	264, 076	124	109	38, 996	2, 411	37, 587	16. 3
1872	20, 858	12. 0	249, 997	111. 4	278, 522	121	111	52, 015	1, 841	50, 705	20. 3
1873	22, 172	12. 7	281, 255	106. 9	300, 670	116	103	91, 510	2, 117	90, 418	32. 1
1874	24, 967	12. 3	308, 103	86. 3	265, 881	95	98	72, 913	368	72, 845	23. 6
1875	26, 382	11. 1	292, 136	89. 5	261, 397	106	86	74, 751	1, 664	74, 508	25. 5
1876	27, 627	10. 5	289, 356	97. 0	280, 743	122	92	57, 044	366	57, 148	19. 8
1877	26, 278	13. 9	364, 194	105. 7	385, 089	111	121	92, 142	1, 391	92, 028	25. 3
1878	32, 109	13. 1	420, 122	77. 6	325, 814	90	95	150, 503	2, 074	150, 253	35. 8
1879	*35, 430*	*13. 0*	*459, 483*								
1879	35, 430	14. 1	499, 893	110. 6	552, 884	110	99	181, 807	487	181, 951	36. 4
1880	37, 987	13. 1	498, 550	95. 1	474, 202	100	105	188, 308	212	188, 250	37. 8
1881	37, 709	10. 2	383, 280	119. 2	456, 880	128	115	123, 371	867	123, 211	32. 1
1882	37, 067	13. 6	504, 185	88. 4	445, 602	105	118	150, 113	1, 088	150, 000	29. 8
1883	36, 456	11. 6	421, 086	91. 1	383, 649	93	102	113, 822	33	113, 892	27. 0
1884	39, 476	13. 0	512, 765	64. 5	330, 862	79	83	135, 232	213	135, 301	26. 4
1885	34, 189	10. 4	357, 112	77. 1	275, 320	81	88	96, 611	389	96, 569	27. 0
1886	36, 806	12. 4	457, 218	68. 7	314, 226	77	76	156, 685	283	156, 760	34. 3
1887	37, 642	12. 1	456, 329	68. 1	310, 613	75	75	122, 616	596	122, 524	26. 8
1888	37, 336	11. 1	415, 868	92. 6	385, 248	95	88	90, 944	136	91, 030	21. 9
1889	*33, 580*	*13. 9*	*468, 374*								
1889	33, 580	12. 9	434, 383	69. 5	301, 869	81	86	112, 488	163	112, 507	25. 9
1890	34, 048	11. 1	378, 097	83. 3	315, 112	97	89	109, 017	586	109, 054	28. 8
1891	37, 826	11. 5	584, 504	83. 4	487, 463	89	96	229, 465	2, 463	228, 841	39. 2
1892	39, 552	13. 3	527, 987	62. 2	328, 331	73	78	196, 068	968	195, 672	37. 1
1893	37, 934	11. 3	427, 553	53. 5	228, 599	60	68	168, 498	1, 183	167, 531	39. 2

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns.

[1] Spring wheat prices compiled as follows: 1849–1870, from Chicago newspapers, quoted; 1849, spring wheat, contract grade; 1859, standard spring, contract grade; 1866–1870, No. 1 spring, contract grade; 1871–1884, annual reports of Chicago Board of Trade, quoted as No. 2 spring, contract grade; 1885–1896, Bartel's Red Book, quoted as No. 2 spring; January, 1897–June, 1904, Chicago Daily Trade Bulletin, average of daily ranges; quotations used; January–October, 1897, No. 3 spring; November, 1897–June, 1898, No. 3 spring, hard varieties; July, 1898–June, 1904, No. 1 spring; from February, 1897, "free on board" was used when available; July, 1904–December, 1918, Bartel's Red Book, average of daily ranges, quoted as No. 1 northern. Subsequently from the Chicago Daily Trade Bulletin and are averages of the daily cash price per bushel weighted by car-lot sales.

[2] Prices, 1839–1898, are from the Price Current Grain Reporter 1924 Yearbook, p. 4, and are average cash prices for calendar years; subsequently from the Chicago Daily Trade Bulletin and are averages of the daily cash price per bushel weighted by car-lot sales.

[3] Compiled from Commerce and Navigation of the United States, 1849, 1859, 1866–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929. Wheat flour converted to terms of grain on the following basis: 1849, 1859, 1866–1879, 1 barrel is the product of 5 bushels of grain; 1880–1908, 4.75; 1909–1917, 4.7; 1918–1919, 4.5; 1920, 4.6; 1921–1929, 4.7.

[4] Includes flour milled from imported wheat.

[5] Includes wheat imported for milling in bond and export.

[6] Total exports (domestic plus foreign) minus total imports.

[7] Imports of flour estimated.

TABLE 1.—*Wheat: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1929*—Continued

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Spring wheat, price per bushel at Chicago, year beginning July 1	No. 2 red winter wheat, price per bushel at Chicago, year beginning July 1	Foreign trade, including flour, year beginning July 1			
								Domestic exports	Imports	Net exports	
										Total	Percentage of production
	1,000 acres	*Bush.*	*1,000 bush.*	*Cts.*	*1,000 dolls.*	*Cts.*	*Cts.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Per cent*
1894	39, 425	13. 1	516, 485	48. 9	252, 709	57	57	148, 630	1, 439	147, 740	28. 6
1895	40, 848	13. 9	569, 456	50. 3	286, 539	61	62	130, 099	2, 117	130, 345	22. 9
1896	43, 916	12. 4	544, 193	71. 7	390, 346	70	67	148, 767	1, 545	148, 725	27. 3
1897	46, 046	13. 3	610, 254	80. 9	493, 683	91	86	221, 143	2, 060	220, 965	36. 2
1898	51, 007	15. 1	772, 163	58. 2	449, 022	71	90	227, 240	1, 875	227, 300	29. 4
1899	*52, 589*	*12. 5*	*658, 534*	------	------	------	------	------	------	------	------
1899	52, 589	12. 1	636, 051	58. 6	372, 982	70	72[8]	190, 772	320	190, 749	30. 0
1900	51, 387	11. 7	602, 708	62. 0	373, 578	75	76	220, 653	603	220, 723	36. 6
1901	52, 473	15. 0	788, 638	62. 6	493, 766	74	72	239, 212	121	239, 137	30. 3
1902	49, 649	14. 6	724, 808	63. 0	456, 851	77	75	207, 835	1, 080	208, 016	28. 7
1903	51, 632	12. 9	663, 923	69. 5	461, 439	90	83	124, 977	229	124, 926	18. 8
1904	47, 825	12. 5	596, 911	92. 4	551, 788	114	100[9]	46, 319	3, 296	43, 612	7. 3
1905	49, 389	14. 7	726, 819	74. 6	542, 543	89	88[8]	101, 089	273	100, 849	13. 9
1906	47, 800	15. 8	756, 775	66. 2	501, 316	84	77	150, 597	602	150, 594	19. 9
1907	45, 116	14. 1	637, 981	86. 5	552, 074	107	90	166, 525	530	166, 304	26. 1
1908	45, 970	14. 0	644, 656	92. 2	594, 128	116	96	116, 373	475	115, 901	18. 0
1909	*44, 263*	*15. 4*	*683, 379*	------	------	------	------	------	------	------	------
1909	44, 262	15. 8	700, 434	98. 4	689. 108	114	110	89, 173	845	88, 465	12. 6
1910	45, 681	13. 9	635, 121	88. 3	561, 051	107	102	71, 338	1, 175	70, 164	11. 0
1911	49, 543	12. 5	621, 338	87. 4	543, 063	110	90	81, 891	3, 445	78, 447	12. 6
1912	45, 814	15. 9	730, 267	76. 0	555, 280	94	103	145, 159	1, 304	143, 938	19. 7
1913	50, 184	15. 2	763, 380	79. 9	610, 122	93	88	147, 955	2, 402	146, 306	19. 2
1914	53, 541	16. 6	891, 017	98. 6	878, 680	132	108	335, 702	728	335, 162	37. 6
1915	60, 469	17. 0	1, 025, 801	91. 9	942, 303	120	113	246, 221	7, 254	239, 591	23. 4
1916	52, 316	12. 2	636, 318	160. 3	1, 019, 968	196	168	205, 962	24, 960	181, 067	28. 5
1917	45, 089	14. 1	636, 655	200. 8	1, 278, 112	227	225	132. 579	31, 215	102, 775	16. 1
1918	59, 181	15. 6	921, 438	204. 2	1, 881, 826	234	222	287, 402	11, 289	276, 615	30. 0
1919	*73, 099*	*12. 9*	*945, 403*	------	------	------	------	------	------	------	------
1919	75, 694	12. 8	967, 979	214. 9	2, 080, 056	276	224	222, 030	5, 511	216, 671	22. 4
1920	61, 143	13. 6	833, 027	143. 7	1, 197, 263	198	223	369, 313	57, 682	312, 625	37. 5
1921	63, 696	12. 8	814, 905	92. 6	754, 834	136	125	282, 566	17, 375	265, 590	32. 6
1922	62, 317	13. 9	867, 598	100. 7	873, 412	122	114	224, 900	20, 031	205, 079	23. 6
1923	59, 659	13. 4	797, 394	92. 3	736, 006	119	102	159, 880	28, 079	131, 892	16. 5
1924	*50, 862*	*15. 7*	*800, 877*	------	------	------	------	------	------	------	------
1924	52, 535	16. 5	864, 428	129. 9	1, 123, 086	155	158	260, 803	6, 201	254, 695	29. 5
1925	52, 367	12. 9	676, 765	141. 6	958, 364	166	164	108, 035	15, 679	92, 669	13. 7
1926	56, 359	14. 8	831, 381	119. 8	996, 308	140	138	219, 160	13, 264	205, 994	24. 8
1927	58, 784	14. 9	878, 374	111. 5	979, 813	140	140	206, 259	15, 734	190, 578	21. 7
1928	58, 272	15. 7	914, 876	97. 0	887, 184	118	138	163, 687	21, 442	142, 301	15. 8
1929[10]	61, 141	13. 2	806, 508	104. 3	840, 921	------	------	------	------	------	------

[8] Weighted average for 11 months.
[9] Weighted average for 10 months.
[10] Preliminary.

TABLE 2.—*Wheat: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage harvested: Av., 1923–1927	1926	1927	1928	1929[1]	Production: Av., 1923–1927	1926	1927	1928	1929[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	5	6	4	4	4	124	120	72	80	92
Vermont	2	2	1	1	1	41	40	20	16	18
New York	324	279	301	316	287	6,290	4,887	6,291	4,702	4,584
New Jersey	61	60	60	60	62	1,271	1,320	1,380	1,200	1,178
Pennsylvania	1,164	1,177	1,098	1,108	1,119	21,883	23,533	20,301	17,171	20,138
North Atlantic	1,555	1,524	1,464	1,489	1,473	29,610	29,900	28,064	23,169	26,010
Ohio	1,847	1,795	1,615	872	1,732	33,997	40,384	29,068	9,475	33,770
Indiana	1,809	1,703	1,790	910	1,631	30,143	34,048	27,749	10,040	27,723
Illinois	2,585	2,283	2,509	1,563	2,451	42,650	41,034	34,844	22,939	36,537
Michigan	911	984	897	887	904	17,707	17,998	19,270	14,202	16,810
Wisconsin	124	128	145	104	105	2,553	2,599	3,142	2,141	2,190
Minnesota	1,902	1,929	1,763	1,532	1,372	27,451	24,811	20,925	22,964	19,944
Iowa	478	378	441	452	454	9,063	8,078	8,236	8,723	8,794
Missouri	1,822	1,403	1,568	1,511	1,730	23,573	21,474	15,700	19,194	17,300
North Dakota	9,531	9,653	10,246	10,810	9,918	104,902	77,081	130,191	155,358	93,396
South Dakota	2,587	1,917	3,037	3,360	3,114	30,301	11,611	45,386	34,928	30,247
Nebraska	3,124	3,077	3,630	3,672	3,548	47,594	40,085	73,826	69,919	56,555
Kansas	9,362	10,147	9,946	10,473	11,516	116,513	150,084	111,327	177,833	138,060
North Central	36,081	35,397	37,587	36,146	38,475	486,447	469,287	519,664	547,716	481,326
Delaware	102	103	98	102	101	1,899	2,060	1,862	1,836	1,919
Maryland	528	520	525	530	541	10,193	11,960	9,188	8,745	9,468
Virginia	694	687	687	673	700	9,650	11,336	8,381	9,758	8,960
West Virginia	153	147	135	122	134	2,101	2,352	1,796	1,586	1,782
North Carolina	459	447	483	444	457	5,389	6,303	5,168	5,150	5,347
South Carolina	82	50	80	64	64	948	800	880	800	768
Georgia	119	104	125	94	85	1,242	1,560	1,150	1,034	850
South Atlantic	2,136	2,058	2,133	2,029	2,082	31,422	36,371	28,425	28,909	29,094
Kentucky	321	258	296	125	240	4,111	4,773	2,812	1,000	2,832
Tennessee	418	440	528	422	405	4,796	7,920	3,696	3,714	3,645
Alabama	8	7	7	4	4	91	94	74	44	40
Mississippi	5	4	6	3	4	76	68	102	60	68
Arkansas	38	30	28	22	26	453	405	322	253	312
Oklahoma	3,674	4,214	3,708	4,413	4,236	46,240	73,745	33,372	59,576	44,478
Texas	1,479	1,802	1,850	2,016	2,520	19,783	32,796	17,945	22,176	37,800
South Central	5,943	6,755	6,423	7,005	7,435	75,550	119,801	58,323	86,823	89,175
Montana	3,421	3,570	3,850	4,275	4,166	51,896	44,744	80,208	77,998	40,098
Idaho	1,004	1,045	1,171	1,160	1,083	25,845	24,633	32,374	28,792	25,515
Wyoming	179	198	226	243	233	3,109	3,714	4,186	3,897	3,331
Colorado	1,388	1,485	1,419	1,339	1,397	18,337	18,793	20,112	18,564	18,012
New Mexico	141	249	55	186	305	2,213	5,653	570	2,054	5,742
Arizona	40	38	58	47	42	980	950	1,450	1,269	1,134
Utah	237	237	242	257	266	5,431	5,505	5,678	6,861	6,403
Nevada	17	17	18	18	16	429	408	460	482	404
Washington	2,147	2,107	2,261	2,271	2,430	45,437	40,901	58,436	48,644	44,910
Oregon	1,011	1,026	1,065	1,027	1,058	21,176	18,706	26,782	23,318	23,114
California	639	653	812	780	680	11,785	12,015	13,642	16,380	12,240
Far Western	10,225	10,625	11,177	11,603	11,676	186,638	176,022	243,898	228,259	180,903
United States	55,941	56,359	58,784	58,272	61,141	809,668	831,381	878,374	914,876	806,508

Bureau of Agricultural Economics. Estimates of the crop-reporting board

[1] Preliminary.

TABLE 3.—*Wheat, winter: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage harvested					Production				
	Av., 1923–1927	1926	1927	1928	1929[1]	Av., 1923–1927	1926	1927	1928	1929[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
New York	313	270	289	306	278	6, 105	4, 725	6, 069	4, 529	4, 448
New Jersey	61	60	60	60	62	1, 271	1, 320	1, 380	1, 200	1, 178
Pennsylvania	1, 159	1, 170	1, 090	1, 101	1, 112	21, 795	23, 400	20, 165	17, 066	20, 016
North Atlantic	1, 533	1, 500	1, 439	1, 467	1, 452	29, 171	29, 445	27, 614	22, 795	25, 642
Ohio	1, 841	1, 789	1, 610	864	1, 728	33, 871	40, 252	28, 980	9, 331	33, 696
Indiana	1, 804	1, 697	1, 782	900	1, 627	30, 057	33, 940	27, 621	9, 900	27, 659
Illinois	2, 474	2, 163	2, 293	1, 261	2, 270	40, 654	38, 934	30, 956	17, 654	33, 369
Michigan	905	979	891	882	900	17, 607	17, 916	19, 156	14, 112	16, 740
Wisconsin	67	65	73	42	39	1, 426	1, 339	1, 716	777	936
Minnesota	145	146	155	165	150	2, 848	2, 555	3, 317	2, 640	3, 150
Iowa	443	342	400	411	407	8, 550	7, 524	7, 600	8, 014	8, 018
Missouri	1, 814	1, 391	1, 558	1, 496	1, 720	23, 451	21, 282	15, 580	18, 999	17, 200
South Dakota	103	75	105	105	94	1, 349	638	1, 890	1, 260	1, 316
Nebraska	2, 904	2, 881	3, 457	3, 492	3, 354	44, 760	37, 165	70, 868	66, 697	53, 664
Kansas	9, 352	10, 139	9, 936	10, 433	11, 476	116, 443	150, 057	111, 283	177, 361	137, 712
North Central	21, 851	21, 667	22, 260	20, 051	23, 765	321, 016	351, 602	318, 967	326, 745	333, 460
Delaware	102	103	98	102	101	1, 899	2, 060	1, 862	1, 836	1, 919
Maryland	528	520	525	530	541	10, 193	11, 960	9, 188	8, 745	9, 468
Virginia	694	687	687	673	700	9, 650	11, 336	8, 381	9, 758	8, 960
West Virginia	153	147	135	122	134	2, 101	2, 352	1, 796	1, 586	1, 782
North Carolina	459	447	483	444	457	5, 389	6, 303	5, 168	5, 150	5, 347
South Carolina	82	50	80	64	64	948	800	880	800	768
Georgia	119	104	125	94	85	1, 242	1, 560	1, 150	1, 034	850
South Atlantic	2, 136	2, 058	2, 133	2, 029	2, 082	31, 422	36, 371	28, 425	28, 909	29, 094
Kentucky	321	258	296	125	240	4, 111	4, 773	2, 812	1, 000	2, 832
Tennessee	418	440	528	422	405	4, 796	7, 920	3, 696	3, 714	3, 645
Alabama	8	7	7	4	4	91	94	74	44	40
Mississippi	5	4	6	3	4	76	68	102	60	68
Arkansas	38	30	28	22	26	453	405	322	253	312
Oklahoma	3, 674	4, 214	3, 708	4, 413	4, 236	46, 240	73, 745	33, 372	59, 576	44, 478
Texas	1, 479	1, 802	1, 850	2, 016	2, 520	19, 783	32, 796	17, 945	22, 176	37, 800
South Central	5, 943	6, 755	6, 423	7, 005	7, 435	75, 550	119, 801	58, 323	86, 823	89, 175
Montana	527	521	648	803	522	9, 202	7, 294	14, 256	12, 045	7, 308
Idaho	435	447	501	456	520	10, 356	10, 281	12, 274	10, 488	11, 440
Wyoming	36	48	54	75	82	597	864	918	1, 125	1, 066
Colorado	1, 096	1, 207	1, 086	923	1, 043	13, 618	14, 484	14, 118	11, 076	11, 994
New Mexico	102	212	25	150	263	1, 616	4, 876	150	1, 500	4, 734
Arizona	40	38	58	47	42	980	950	1, 450	1, 269	1, 134
Utah	145	149	152	162	166	2, 784	3, 129	2, 888	3, 726	3, 403
Nevada	4	5	4	4	4	94	120	96	104	104
Washington	999	847	1, 228	1, 424	1, 210	24, 589	19, 481	36, 226	35, 600	27, 830
Oregon	758	880	900	837	896	16, 478	16, 720	23, 400	20, 088	19, 712
California	639	653	812	780	680	11, 785	12, 015	13, 642	16, 380	12, 240
Far Western	4, 781	5, 007	5, 468	5, 661	5, 428	92, 098	90, 214	119, 418	113, 401	100, 965
United States	36, 244	36, 987	37, 723	36, 213	40, 162	549, 257	627, 433	552, 747	578, 673	578, 336

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 4.—*Wheat, spring: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

SPRING WHEAT OTHER THAN DURUM

State and division	Acreage harvested					Production				
	Av., 1923–1927	1926	1927	1928	1929[1]	Av., 1923–1927	1926	1927	1928	1929[1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	5	6	4	4	4	124	120	72	80	92
Vermont	2	2	1	1	1	41	40	20	16	18
New York	10	9	12	10	9	186	162	222	173	136
Pennsylvania	[2] 9	7	8	7	7	[2] 146	133	136	105	122
North Atlantic	23	24	25	22	21	439	455	450	374	368
Ohio	6	6	5	8	4	126	132	88	144	74
Indiana	5	6	8	10	4	86	108	128	140	64
Illinois	110	120	216	302	181	1,996	2,100	3,888	5,285	3,168
Michigan	6	5	6	5	4	100	82	114	90	70
Wisconsin	58	63	72	62	66	1,127	1,260	1,426	1,364	1,254
Minnesota	1,566	1,592	1,340	1,032	1,001	21,803	19,582	14,070	14,964	13,413
Iowa	35	36	41	41	47	513	554	636	709	776
Missouri	8	12	10	15	10	123	192	120	195	100
North Dakota	6,007	5,849	6,024	5,660	6,056	60,935	40,943	71,083	78,108	56,321
South Dakota	1,527	1,077	1,953	1,933	1,817	16,485	5,924	27,342	19,523	17,262
Nebraska	220	196	173	180	194	2,833	2,920	2,958	3,222	2,891
Kansas	10	8	10	40	40	70	27	44	472	348
North Central	9,558	8,970	9,858	9,288	9,424	106,197	73,824	121,897	124,216	95,741
Montana	2,834	3,035	3,187	3,443	3,615	41,940	37,330	65,652	65,417	32,535
Idaho	569	598	670	704	563	15,489	14,352	20,100	18,304	14,075
Wyoming	143	150	172	168	151	2,513	2,850	3,268	2,772	2,265
Colorado	292	278	333	416	354	4,719	4,309	5,994	7,488	6,018
New Mexico	39	37	30	36	42	597	777	420	554	1,008
Utah	92	88	90	95	100	2,647	2,376	2,790	3,135	3,000
Nevada	13	12	14	14	12	335	288	364	378	300
Washington	1,149	1,260	1,033	847	1,220	20,848	21,420	22,210	13,044	17,080
Oregon	253	146	165	190	162	4,699	1,986	3,382	3,230	3,402
Far Western	5,384	5,604	5,694	5,913	6,219	93,787	85,688	124,180	114,322	79,683
United States	14,965	14,598	15,577	15,223	15,664	200,423	159,967	246,527	238,912	175,792

DURUM WHEAT

Minnesota	191	191	268	335	221	2,800	2,674	3,538	5,360	3,381
North Dakota	3,524	3,804	4,222	5,150	3,862	43,967	36,138	59,108	77,250	37,075
South Dakota	957	765	979	1,322	1,203	12,467	5,049	16,154	14,145	11,669
Montana	60	14	15	29	29	754	120	300	536	255
Total	4,732	4,774	5,484	6,836	5,315	59,988	43,981	79,100	97,291	52,380

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary. [2] 3-year average.

TABLE 5.—*Wheat: Yield per acre and price per bushel December 1, by States, averages, and annual 1924–1929*

ALL WHEAT

State and division	Yield per acre							Price per bushel received by producers						
	Av., 1918–1927	1924	1925	1926	1927	1928	1929	Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	22.3	26.0	28.0	20.0	18.0	20.0	23.0	162	170	170	175	175	165	150
Vermont	19.5	21.0	21.0	20.0	20.0	16.0	18.0	143	152	150	132	140	131	122
New York	19.6	18.7	19.5	17.5	20.9	14.9	16.0	133	144	152	132	125	137	124
New Jersey	19.4	18.5	21.0	22.0	23.0	20.0	19.0	133	157	143	132	125	124	123
Pennsylvania	18.1	16.5	20.0	20.0	18.5	15.5	18.0	129	144	147	129	127	129	121
North Atlantic	18.6	17.1	20.0	19.6	19.2	15.6	17.7	130.4	144.6	148.0	129.8	126.6	130.4	121.7
Ohio	17.0	18.0	15.0	22.5	18.0	10.9	19.5	131	145	158	127	125	131	116
Indiana	15.8	17.0	14.5	20.0	15.5	11.0	17.0	129	142	155	124	124	124	112
Illinois	17.0	16.1	16.1	18.0	13.9	14.7	14.9	124	136	150	122	120	112	111
Michigan	17.6	24.0	17.0	18.3	21.5	16.0	18.6	126	138	156	122	120	128	113
Wisconsin	18.6	24.0	20.1	20.3	21.7	20.6	20.9	121	128	136	126	117	106	110
Minnesota	13.6	22.1	13.4	12.9	11.9	15.0	14.5	119	130	137	123	110	96	105
Iowa	18.7	20.2	16.2	21.4	18.7	19.3	19.5	118	127	136	120	117	100	106
Missouri	13.1	13.3	13.2	15.3	10.0	12.7	10.0	125	133	150	124	122	121	113
North Dakota	10.8	15.7	11.7	8.0	12.7	14.4	9.4	113	126	131	117	103	81	97
South Dakota	11.6	14.6	11.8	6.1	14.9	10.4	9.7	112	125	128	118	106	85	93
Nebraska	14.6	19.1	12.8	13.0	20.3	19.0	15.9	114	122	140	117	109	94	99
Kansas	13.0	16.3	9.0	14.8	11.2	17.0	12.0	121	128	148	119	117	94	100
North Central	13.2	16.8	12.1	13.3	13.8	15.2	12.5	119.1	129.6	141.8	120.3	112.2	93.7	102.9
Delaware	16.3	17.8	18.5	20.0	19.0	18.0	19.0	129	144	145	130	125	125	116
Maryland	17.3	15.8	21.0	23.0	17.5	16.5	17.5	131	145	151	130	127	127	118
Virginia	12.8	13.4	14.2	16.5	12.2	14.5	12.8	136	148	161	131	132	135	125
West Virginia	13.3	13.0	13.5	16.0	13.3	13.0	13.3	139	147	158	135	137	137	133
North Carolina	10.2	12.0	11.0	14.1	10.7	11.6	11.7	149	160	171	143	145	152	141
South Carolina	11.1	11.0	11.0	16.0	11.0	12.5	12.0	163	170	185	155	152	161	150
Georgia	10.3	9.5	10.5	15.0	9.2	11.0	10.0	161	169	182	150	155	167	155
South Atlantic	13.2	13.7	15.2	17.7	13.3	14.2	14.0	138.3	15.02	158.9	134.3	134.2	136.9	127.1
Kentucky	12.1	10.3	14.0	18.5	9.5	8.0	11.8	136	143	160	133	135	138	126
Tennessee	10.6	10.5	12.5	18.0	7.0	8.8	9.0	141	147	166	136	139	143	132
Alabama	10.4	10.0	11.0	13.4	10.6	11.0	10.0	156	162	175	160	155	157	152
Mississippi	14.6	12.4	18.0	17.0	17.0	20.0	17.0	137	150	160	129	135	137	135
Arkansas	11.4	11.5	13.0	13.5	11.5	11.5	12.0	129	133	150	128	125	122	129
Oklahoma	12.6	16.0	8.2	17.5	9.0	13.5	10.5	120	124	147	118	120	100	99
Texas	12.2	18.5	8.0	18.2	9.7	11.0	15.0	126	129	155	120	121	110	105
South Central	12.3	16.1	8.8	17.7	9.1	12.4	12.0	124.0	126.8	151.4	120.4	122.3	105.0	103.9
Montana	12.8	16.4	10.8	12.5	20.8	18.2	9.6	111	124	139	112	96	83	95
Idaho	23.5	19.4	28.1	23.6	27.6	24.8	23.6	108	131	125	106	98	90	95
Wyoming	17.7	15.2	17.5	18.8	18.5	16.0	14.3	103	111	124	107	94	83	89
Colorado	13.7	14.4	11.8	12.7	14.2	13.9	12.9	110	118	136	107	104	85	93
New Mexico	14.2	14.2	6.2	22.7	10.4	11.0	18.8	122	125	150	110	119	107	96
Arizona	24.2	21.0	23.0	25.0	25.0	27.0	27.0	144	141	175	130	135	130	135
Utah	21.1	16.5	26.2	23.2	23.5	26.7	24.1	112	130	130	105	102	98	102
Nevada	24.7	22.6	30.4	24.0	25.6	26.8	25.2	130	150	146	116	125	122	129
Washington	18.6	14.3	19.4	19.4	25.8	21.4	18.5	114	130	130	116	108	100	107
Oregon	19.9	16.5	19.6	18.2	25.1	22.7	21.8	117	129	136	120	112	103	111
California	17.2	15.0	19.0	18.4	16.8	21.0	18.0	132	154	148	130	118	118	120
Far Western	16.8	15.8	16.4	16.6	21.8	19.7	15.5	112.7	126.9	134.1	113.4	103.1	93.4	101.9
United States	14.1	16.5	12.9	14.8	14.9	15.7	13.2	119.0	129.9	141.6	119.8	111.5	97.0	104.3

DURUM WHEAT

								Price of No. 2 amber durum at Minneapolis						
Minnesota	14.8	21.5	15.2	14.0	13.2	16.0	15.3	----	----	----	----	----	----	----
North Dakota	12.1	16.3	14.6	9.5	14.0	15.0	9.6	----	----	----	----	----	----	----
South Dakota	13.3	15.4	13.9	6.6	16.5	10.7	9.7	----	----	----	----	----	----	----
Montana	12.2	18.0	10.0	8.6	20.0	18.5	8.8	----	----	----	----	----	----	----
Average	12.4	16.3	14.4	9.2	14.4	14.2	9.9	----	156	144	155	132	113	----

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Prices of No. 2 amber durum from the Minneapolis Daily Market Record

TABLE 6.—*Winter and spring wheat: Acreage sown and harvested, production, and farm value, United States, 1910–1929*

Year	Winter wheat						Spring wheat including durum				
	Acreage sown in preceding fall	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Total farm value Dec. 1	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Total farm value Dec. 1
	1,000 acres	*1,000 acres*	*Bush.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 acres*	*Bush.*	*1,000 bushels*	*Cents*	*1,000 dollars*
1910	31,659	27,329	15.9	434,142	88.1	382,318	18,352	11.0	200,979	88.9	178,733
1911	32,648	29,162	14.8	430,656	88.0	379,151	20,381	9.4	190,682	86.0	163,912
1912	33,229	26,571	15.1	399,919	80.9	323,572	19,243	17.2	330,348	70.1	231,708
1913	33,274	31,699	16.5	523,561	82.9	433,995	18,485	13.0	239,819	73.4	176,127
1914	37,158	36,008	19.0	684,990	98.6	675,623	17,533	11.8	206,027	98.6	203,057
1915	42,431	41,308	16.3	673,947	94.7	638,149	19,161	18.4	351,854	86.4	304,154
1916	39,245	34,709	13.8	480,553	162.7	781,906	17,607	8.8	155,765	152.8	238,062
1917	38,359	27,257	15.1	412,901	202.8	837,237	17,832	12.5	223,754	197.0	440,875
1918	43,126	37,130	15.2	565,099	206.3	1,165,995	22,051	16.2	356,339	200.9	715,831
1919	51,483	50,494	15.1	760,377	210.5	1,600,805	25,200	8.2	207,602	230.9	479,251
1920	44,861	40,016	15.3	610,597	148.6	907,291	21,127	10.5	222,430	130.4	289,972
1921	45,625	43,414	13.8	600,316	95.1	571,044	20,282	10.6	214,589	85.6	183,790
1922	47,930	42,358	13.8	586,878	104.7	614,399	19,959	14.1	280,720	92.3	259,013
1923	46,091	39,508	14.5	571,777	95.1	543,530	20,151	11.2	225,617	85.3	192,476
1924	38,916	35,656	16.6	592,259	131.6	779,548	16,879	16.1	272,169	126.2	343,538
1925	39,951	31,346	12.8	402,070	147.9	594,746	21,021	13.1	274,695	132.4	363,618
1926	39,887	36,987	17.0	627,433	121.2	760,406	19,372	10.5	203,948	115.7	235,902
1927	43,373	37,723	14.7	552,747	116.7	645,326	21,061	15.5	325,627	102.7	334,487
1928	47,317	36,213	16.0	578,673	103.5	599,207	22,059	15.2	336,203	85.7	287,977
1929 [1]	42,820	40,162	14.4	578,336	106.5	616,128	20,979	10.9	228,172	98.5	224,793

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 7.—*Winter wheat: Percentage of acreage abandoned, average 1918–1927, annual 1925–1929* [1]

State	Av., 1918–1927	1925	1926	1927	1928	1929	State	Av., 1918–1927	1925	1926	1927	1928	1929
	P.ct.	*P.ct.*	*P.ct.*	*P.ct.*	*P.ct.*	*P.ct.*		*P.ct.*	*P.ct.*	*P.ct.*	*P.ct.*	*P.ct.*	*P.ct.*
N. Y	4.0	2.5	8.0	1.0	6.0	2.0	Ky	7.6	13.0	2.5	3.0	65.0	3.0
N. J	3.5	2.0	3.0	1.0	5.0	1.0	Tenn	5.1	6.0	1.7	5.0	28.0	4.0
Pa	2.4	2.0	2.0	2.5	9.0	1.0	Ala	7.3	6.0	3.0	10.0	15.0	3.0
Ohio	7.3	23.0	3.0	3.0	64.0	1.0	Miss	18.2	40.0	20.0	10.0	40.0	10.0
Ind	5.1	10.4	3.0	3.0	60.0	4.0	Ark	5.8	10.0	3.0	20.0	30.0	10.0
Ill	5.8	3.0	5.0	5.5	62.0	8.0	Okla	10.8	20.0	2.0	20.0	7.0	6.0
Mich	5.0	1.5	7.0	2.0	10.0	1.5	Tex	18.6	54.0	3.0	24.0	23.0	7.0
Wis	12.4	30.0	10.0	2.5	32.0	2.0	Mont	26.2	70.0	20.0	12.0	18.0	15.0
Minn	9.0	16.0	7.0	2.0	45.0	3.5	Idaho	6.4	15.0	6.0	4.0	5.0	3.0
Iowa	4.6	9.0	4.0	2.5	22.0	3.0	Wyo	10.0	15.0	4.0	12.0	10.0	12.0
Mo	4.8	4.0	5.5	11.0	32.0	4.0	Colo	18.6	30.0	20.0	30.0	40.0	20.0
S. Dak	15.6	25.0	20.0	10.0	40.0	5.0	N. Mex	35.7	80.0	3.0	89.0	45.0	20.0
Nebr	9.0	19.0	12.0	4.0	10.0	9.0	Ariz	6.2	3.0	2.0	1.0	1.0	2.0
Kans	15.3	20.0	11.0	20.0	15.2	5.0	Utah	3.4	2.0	2.0	3.0	2.0	2.5
Del	3.2	1.5	2.0	1.0	1.0	1.0	Nev	3.3	2.0	0	0	1.0	1.5
Md	2.5	1.5	1.5	1.5	3.0	1.5	Wash	14.7	70.0	4.0	6.0	6.0	10.0
Va	2.2	2.0	1.5	2.0	6.0	1.5	Oreg	9.2	65.0	3.0	1.0	3.0	3.0
W. Va	3.4	10.0	1.0	1.5	15.0	1.5	Calif	17.4	25.0	7.0	3.0	9.0	20.0
N. C	2.2	1.5	2.0	3.0	7.0	2.0							
S. C	3.8	4.0	2.5	6.0	12.0	5.0	U. S	10.8	21.5	7.3	13.0	23.5	6.2
Ga	9.8	5.0	3.0	8.0	15.0	6.0							

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For entire season, planting to harvest. Includes winter abandonment, which is estimated on May 1 of each season.

TABLE 8.—*Wheat: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual 1927–1929*

Country	Acreage: Average, 1909–1913 [1]	Acreage: Average, 1921–1925	Acreage: 1927	Acreage: 1928	Acreage: 1929, preliminary	Yield per acre: Average, 1909–1913 [1]	Yield per acre: Average, 1921–1925	Yield per acre: 1927	Yield per acre: 1928	Yield per acre: 1929, preliminary	Production: Average, 1909–1913 [1]	Production: Average, 1921–1925	Production: 1927	Production: 1928	Production: 1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	9,945	22,083	22,460	24,119	25,255	19.8	16.6	21.4	23.5	11.6	197,119	366,483	479,665	566,726	293,899
United States	47,097	58,092	58,784	58,272	61,141	14.7	13.9	14.9	15.7	13.2	690,108	804,151	878,374	914,876	806,508
Mexico	[2] 2,174	2,098	1,311	1,283	1,254	[2] 5.3	5.0	9.1	8.6	9.2	[3] 11,481	10,388	11,890	11,031	11,559
Guatemala	------	24	23	20	18	------	9.2	9.6	8.4	8.4	------	222	220	167	152
EUROPE															
United Kingdom:															
England and Wales	1,787	1,746	1,636	1,396	1,330	31.2	32.9	32.5	33.9	35.7	55,770	57,524	53,125	47,264	47,460
Scotland	57	57	67	58	51	39.9	39.5	36.2	39.9	42.5	2,273	2,251	2,427	2,315	2,165
Northern Ireland	8	4	6	5	4	35.9	27.8	35.3	36.6	35.5	287	111	212	183	142
Irish Free State	35	34	34	31	29	37.4	33.3	41.8	38.3	------	1,310	1,131	1,421	1,186	------
Norway	12	27	25	28	------	25.5	23.6	24.2	28.5	------	306	637	605	798	729
Sweden	255	352	562	562	574	31.8	30.1	28.2	34.1	32.6	8,103	10,602	15,835	19,155	18,724
Denmark	154	202	274	252	257	41.1	44.4	34.3	48.5	45.8	6,322	8,973	9,408	12,214	11,758
Netherlands	138	147	153	148	114	36.1	42.7	40.2	49.6	40.9	4,976	6,277	6,157	7,336	4,666
Belgium	404	339	391	425	432	37.6	38.9	41.6	42.3	37.0	15,199	13,194	16,277	17,986	15,995
Luxemburg	27	23	36	37	21	22.8	17.0	19.5	19.3	14.5	615	392	702	713	305
France	16,500	13,507	13,065	12,956	12,749	19.7	21.5	21.1	21.7	25.1	325,644	290,774	276,128	281,285	319,863
Spain	9,547	10,457	10,826	10,480	10,478	13.7	13.6	13.4	11.4	14.2	130,446	142,420	144,825	119,884	149,266
Portugal	[4] 1,211	1,078	1,064	1,102	------	[4] 9.8	10.3	10.8	6.8	------	[4] 11,850	11,103	11,447	7,546	11,110
Italy	11,793	11,537	12,295	12,264	11,803	15.6	17.2	15.9	18.6	22.1	184,393	198,307	195,809	228,596	260,669
Switzerland	105	110	127	127	------	31.6	30.1	32.4	33.6	------	3,314	3,314	4,119	4,270	------
Germany	4,029	3,613	4,321	4,270	3,964	32.6	27.3	27.9	33.2	31.1	131,274	98,714	120,522	141,593	123,090
Austria	635	456	505	505	511	20.2	18.4	23.7	25.5	22.7	12,813	8,400	11,960	12,850	11,582
Czechoslovakia	1,718	1,523	1,579	1,871	2,023	22.0	23.6	25.6	27.5	23.8	37,879	36,015	40,385	51,499	48,065
Hungary	3,712	3,345	4,021	4,144	3,913	19.3	17.8	19.1	23.9	18.4	71,493	59,678	76,933	99,211	71,853
Yugoslavia	3,982	3,953	4,521	4,747	5,289	15.6	14.9	12.5	21.8	18.0	62,024	58,753	56,568	103,294	94,998
Greece	[4] 1,134	1,075	1,233	1,329	1,129	[4] 14.4	8.8	10.5	9.8	7.5	[4] 16,273	9,417	12,970	13,085	8,481
Bulgaria	2,409	2,390	2,673	2,779	2,617	15.7	13.1	15.8	18.2	12.7	37,823	31,399	42,121	50,691	33,140
Rumania	[3] 9,515	7,068	7,663	7,923	6,764	[3] 16.7	12.7	12.6	14.6	14.7	[3] 158,672	89,570	96,734	115,544	99,752
Poland	3,350	2,957	3,360	3,187	3,426	19.0	16.5	18.2	18.6	17.6	63,675	48,708	61,093	59,219	60,259
Lithuania	211	214	297	393	488	15.5	16.6	17.8	16.1	18.1	3,264	3,563	5,273	6,327	8,818
Latvia	85	89	145	164	145	17.4	16.0	18.2	15.2	16.3	1,475	1,426	2,636	2,499	2,266
Estonia	23	47	67	70	82	15.8	14.2	16.1	14.8	15.5	364	667	1,079	1,037	1,268

Finland	8	36	44	46	47	17.1	20.5	24.2	21.7	23.3	137	739	1,064	998	1,095
Russia	74,209	42,799	77,238	68,170	----	10.2	9.8	9.7	11.5	----	758,941	419,259	751,920	783,224	----
Estimated European total, excluding Russia	72,800	66,000	71,000	71,000	70,000	----	----	----	----	----	1,348,000	1,194,000	1,268,000	1,409,000	1,415,000
AFRICA															
Morocco	(1,700)	2,272	2,304	2,665	2,843	----	9.6	10.7	9.3	9.5	(17,000)	21,758	24,618	24,746	26,885
Algeria	3,521	3,416	3,469	3,656	3,722	10.0	7.8	8.2	8.3	8.8	35,161	26,647	28,323	30,302	32,833
Tunis	1,310	1,402	1,408	2,011	1,730	4.8	5.6	5.9	6.0	7.1	6,224	7,892	8,267	12,125	12,309
Egypt	1,314	1,462	1,655	1,590	1,614	25.6	25.2	26.8	23.5	28.0	33,662	36,806	44,347	37,296	45,228
ASIA															
Cyprus	162	191	171	168	----	13.7	12.0	14.0	9.3	----	2,216	2,292	2,390	1,557	----
India	29,224	29,560	31,303	32,193	32,011	12.0	11.4	10.7	9.0	9.9	351,841	336,269	334,992	290,864	317,595
Japanese Empire:															
Japan	1,179	1,197	1,161	1,201	1,214	21.3	23.9	26.7	25.7	25.1	25,088	28,553	31,018	30,812	30,496
Chosen	574	882	897	896	875	12.0	11.6	10.1	9.6	9.5	6,898	10,208	9,043	8,595	8,319
Formosa	15	7	1	1	1	11.3	9.1	14.0	15.0	----	169	64	14	15	----
Kwantung	[5] 4	4	4	4	----	[5] 10.0	11.8	9.8	8.0	----	[5] 40	47	39	32	----
Estimated Asiatic total excluding Russia and China	37,600	37,900	40,300	39,000	39,000	----	----	----	----	----	419,000	447,000	455,000	369,000	425,000
Estimated Northern Hemisphere total excluding Russia and China	177,500	195,100	202,900	204,100	206,200	----	----	----	----	----	2,759,000	2,917,000	3,200,000	3,376,000	3,072,000
SOUTHERN HEMISPHERE															
Brazil	----	[3] 224	330	----	----	----	21.9	12.7	----	----	----	4,908	4,203	----	----
Chile	1,003	1,443	1,530	1,500	----	29.9	17.9	18.5	18.4	----	20,062	25,761	28,307	27,650	----
Uruguay	[3] 791	867	1,151	1,256	1,121	[3] 8.2	11.2	13.4	11.7	----	[3] 6,517	9,680	15,397	14,672	----
Argentina	16,051	16,935	19,714	20,900	19,430	9.2	12.0	12.1	14.7	7.4	147,059	203,388	239,162	307,360	143,175
Union of South Africa	[4] 803	868	910	985	938	[4] 7.5	8.6	7.3	7.0	11.9	[4] 6,034	7,459	6,644	6,930	11,203
Southern Rhodesia	----	[5] 4	3	3	----	----	[5] 6.2	10.7	7.0	----	----	[5] 31	32	21	----
Australia	7,603	10,010	12,279	14,584	14,500	11.9	12.8	9.6	11.0	7.7	90,497	128,520	118,199	160,475	112,000
New Zealand	241	224	261	255	234	28.7	29.6	36.6	34.6	----	6,925	6,640	9,541	8,819	----
Estimated Southern Hemisphere total	26,700	31,000	36,800	40,600	38,800	----	----	----	----	----	282,000	390,000	461,000	567,000	343,000
Estimated world total excluding Russia and China	204,200	226,100	239,700	244,700	245,000	----	----	----	----	----	3,041,000	3,307,000	3,661,000	3,943,000	3,415,000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures in parentheses indicate unofficial estimates. For each year is shown the harvest during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes in boundary have occurred, averages are estimates for territory within present boundaries.
[2] 2-year average.
[3] 4-year average.
[4] 1-year only.
[5] 3-year average.

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TABLE 9.—*Wheat: World production, 1890–1929*

Year	World production excluding Russia and China	Northern Hemisphere production excluding Russia and China	European production excluding Russia	Selected countries						
				Russia [1]	United States	Canada	India	Argentina	Australia	France
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1890	1,878	1,802	1,056	213	378	----------	229	31	27	330
1891	1,989	1,904	900	181	585	----------	257	36	26	215
1892	2,053	1,938	1,045	266	528	----------	227	59	33	311
1893	2,076	1,936	1,097	482	428	----------	286	82	37	278
1894	2,128	2,018	1,080	477	516	----------	271	61	28	344
1895	2,126	2,039	1,057	310	569	----------	261	46	18	340
1896	2,057	1,986	1,103	412	544	----------	201	32	21	340
1897	1,893	1,790	842	340	610	----------	200	53	28	242
1898	2,552	2,374	1,168	459	772	----------	269	105	41	365
1899	2,319	2,150	1,113	454	636	----------	255	102	40	365
1900	2,210	2,064	1,096	423	603	----------	200	75	48	326
1901	2,472	2,357	1,103	428	789	----------	265	56	39	311
1902	2,510	2,368	1,207	607	725	----------	227	104	12	328
1903	2,651	2,412	1,266	621	664	----------	298	130	74	363
1904	2,478	2,238	1,116	667	597	----------	360	151	55	300
1905	2,673	2,441	1,223	636	727	----------	283	135	69	335
1906	2,950	2,694	1,356	543	757	----------	320	156	66	329
1907	2,619	2,344	1,176	571	638	----------	317	192	45	381
1908	2,544	2,283	1,181	628	645	112	229	156	63	317
1909 [2]	2,819	2,554	1,240	846	700	167	285	131	90	359
1910 [2]	2,777	2,495	1,201	836	635	132	360	146	95	253
1911 [2]	3,043	2,758	1,347	563	621	231	376	166	72	322
1912 [2]	3,093	2,770	1,284	801	730	224	371	187	92	334
1913 [2]	3,098	2,853	1,301	1,028	763	232	368	105	103	319
1914	2,834	2,601	1,072	[3] 834	891	161	312	169	25	283
1915	3,497	3,102	1,125	[4] 827	1,026	394	377	169	179	223
1916	2,734	2,457	1,049	[5] 531	636	263	323	84	152	205
1917	2,574	2,178	740	622	637	234	382	235	115	[6] 135
1918	2,911	2,608	909	----------	921	189	370	180	76	229
1919	2,821	2,517	899	----------	968	193	280	217	46	187
1920	2,948	2,595	949	320	833	263	378	156	146	237
1921	3,169	2,787	1,216	205	815	301	250	191	129	323
1922	3,225	2,868	1,044	243	868	400	367	196	109	243
1923	3,551	3,119	1,257	419	797	474	372	248	125	276
1924	3,150	2,737	1,058	472	864	262	361	191	165	281
1925	3,441	3,073	1,397	757	676	395	331	191	115	330
1926	3,426	2,984	1,210	889	831	407	325	221	161	232
1927 [7]	3,661	3,200	1,268	752	878	480	335	239	118	276
1928 [7]	3,943	3,376	1,409	783	915	567	291	307	160	281
1929 [7]	3,415	3,072	1,415	----------	807	294	318	148	112	320

Bureau of Agricultural Economics. For each year is shown the production during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Includes all Russian territory reporting for years named.
[2] The average production for the 1909–1913 period as computed from figures given here for estimated world total, Northern Hemisphere total, European total, and European countries whose boundaries were changed by the World War will not agree with estimates appearing elsewhere for present territory, due to changes in boundary.
[3] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[4] Exclusive of Russian Poland, Lithuania, parts of present Latvia and Ukraine, and 2 Provinces of Transcaucasia.
[5] Beginning with this date estimated production is within present boundaries of the Union of Socialist Soviet Republics, excluding Turkestan, Transcaucasia, and the Far East, which regions in 1924 produced 51,706,000 bushels, and in 1925, 58,000,000 bushels.
[6] Beginning with this date production is within postwar boundaries and therefore not comparable with earlier years.
[7] Preliminary.

TABLE 10.—*Wheat: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	7.4	12.4	19.3	18.0	13.7	7.6	4.7	3.9	3.7	4.1	3.1	2.1	100.0
1918	17.6	19.9	18.0	13.8	8.7	7.3	4.6	3.1	2.0	1.6	1.9	1.5	100.0
1919	17.1	23.2	15.6	11.1	7.5	5.7	4.2	3.0	2.9	3.1	3.4	3.2	100.0
1920	12.1	14.3	15.9	10.6	6.9	6.2	5.5	5.3	4.9	5.0	6.4	6.9	100.0
1921	19.1	18.2	16.4	10.6	6.8	5.4	4.4	4.9	3.9	3.2	3.5	3.6	100.0
1922	14.8	17.3	14.2	12.0	8.6	7.4	5.5	5.1	4.3	3.7	3.4	3.7	100.0
1923	13.4	17.6	16.7	13.7	9.5	6.2	4.6	4.8	3.3	2.9	3.7	3.6	100.0
1924	13.6	19.8	17.5	14.5	8.6	5.6	5.3	4.2	2.5	1.6	3.1	3.7	100.0
1925	14.6	18.6	18.7	10.9	8.6	7.0	4.7	4.0	3.0	3.0	2.9	4.0	100.0
1926	21.8	20.3	13.2	10.0	5.8	5.0	4.6	4.6	3.6	2.4	3.2	5.5	100.0
1927	15.4	18.6	19.6	12.6	7.7	5.6	4.5	4.1	3.8	2.5	2.5	3.1	100.0
1928	17.9	18.6	17.0	11.6	7.0	5.4	3.8	4.3	3.4	2.5	2.6	5.9	100.0

Bureau of Agricultural Economics.

TABLE 11.—*Wheat: Stocks and shipments, United States, 1909–1929*

Year beginning July	Stocks of old wheat on farms July 1 [1]	Stocks of old wheat in country mills and elevators July 1 [2]	Merchant mill stocks July 1 [3]	Commercial visible stocks end of week nearest July 1 [4]	Weight per measured bushel of new wheat [5]	Stocks of wheat on farms on Mar. 1 following [1]	Stocks of wheat in country mills and elevators on Mar. 1 following [2]	Shipped out of county where grown [6]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Pounds*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909	14,171				57.9	163,371		428,262
1910	36,725				58.5	162,705	98,597	352,906
1911	34,071				57.8	122,041	95,710	348,739
1912	23,876				58.3	156,471	118,400	449,881
1913	35,515				58.7	151,795	93,627	411,733
1914	32,236				58.0	152,903	85,955	541,198
1915	28,972				57.9	244,448	155,027	633,380
1916	74,731				57.1	100,650	89,173	361,088
1917	15,611				58.5	107,745	66,138	325,500
1918	8,063				58.8	128,703	107,037	541,666
1919	19,261	19,672			56.3	169,904	123,233	591,552
1920	49,546	37,304			57.4	217,037	87,075	491,035
1921	56,707	27,167			57.0	134,253	75,071	502,470
1922	32,359	28,756			57.7	156,087	102,908	584,089
1923	35,894	37,117			57.4	137,721	98,284	505,792
1924	30,981	36,626			58.9	112,095	67,673	630,819
1925	29,357	25,287			58.3	100,174	76,376	483,741
1926	20,982	29,501	22,447		59.1	130,274	85,928	580,351
1927	27,222	21,776	34,149	21,888	58.5	130,944	75,428	644,525
1928	23,729	19,277	29,782	38,587	58.5	151,396	78,411	672,002
1929 [8]	45,483	40,136	45,914	[7] 90,412	58.2			

Bureau of Agricultural Economics. Prior to 1918 stocks in mills and elevators not included.

1 Based on percentage of crop on farms as estimated by crop reporters.
2 Based on percentage of crop as estimated by about 3,500 mill and elevator operators.
3 Stocks in mills and attached mill elevators reporting to Bureau of the Census.
4 Domestic grain in store and afloat at United States markets.
5 Based on estimates of crop reporters on Nov. 1.
6 Based on percentage shipped out as estimated by crop reporters.
7 Revised.
8 Preliminary.

TABLE 12.—*Wheat: Receipts inspected, by markets, 1917–1928*

Market	Year beginning July											
	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Minneapolis	90, 311	123, 119	127, 145	119, 107	109, 461	126, 508	99, 366	76, 960	118, 730	85, 466	129, 966	119, 605
Duluth	23, 481	113, 911	16, 611	50, 194	55, 995	71, 154	38, 460	102, 654	67, 447	49, 985	98, 032	89, 357
Kansas City	24, 848	69, 182	116, 694	115, 200	126, 025	77, 302	59, 948	86, 713	51, 571	90, 535	74, 595	101, 190
Chicago	12, 146	73, 446	62, 244	22, 190	45, 483	39, 207	43, 017	59, 831	19, 058	30, 811	34, 592	25, 827
St. Louis	17, 120	43, 001	43, 685	27, 109	32, 262	27, 254	26, 859	26, 909	25, 148	26, 247	24, 423	34, 714
Omaha	10, 829	24, 066	30, 031	31, 031	30, 140	28, 760	19, 763	31, 660	16, 903	21, 642	30, 008	34, 689
Wichita	7, 000	15, 332	21, 100	16, 363	25, 186	21, 185	22, 151	29, 559	18, 972	28, 166	21, 191	30, 584
Portland, Oreg.	5, 957	10, 612	12, 468	28, 842	36, 566	22, 395	36, 732	21, 559	27, 892	35, 299	42, 931	27, 612
New York	22, 950	49, 990	28, 821	52, 750	33, 136	27, 368	9, 186	21, 978	6, 334	33, 855	45, 096	41, 102
Philadelphia	8, 180	34, 713	23, 816	19, 564	17, 598	36, 893	6, 252	18, 236	5, 767	6, 933	4, 026	1, 378
Baltimore	6, 434	25, 724	24, 522	25, 653	12, 817	13, 434	16, 480	14, 286	13, 862	21, 204	13, 904	17, 854
New Orleans	2, 710	16, 409	15, 678	67, 483	30, 325	24, 628	6, 261	32, 630	2, 235	8, 908	7, 622	5, 810
Galveston	1, 996	10, 128	26, 042	73, 334	44, 126	17, 400	7, 055	33, 953	2, 769	44, 781	11, 332	16, 572
All other inspection points	111, 858	200, 241	236, 976	204, 418	242, 466	224, 418	213, 715	256, 192	201, 036	308, 383	260, 728	346, 593
Total	345, 820	809, 874	785, 833	853, 238	841, 586	757, 906	605, 245	813, 120	577, 724	792, 215	798, 446	892, 887

Bureau of Agricultural Economics. Compiled from reports of licensed inspectors through district offices of Federal grain supervision.

TABLE 13.—*Wheat: Receipts inspected, all inspection points, by classes, 1925–1928*

Class and year beginning July	Grade						Total
	No. 1	No. 2	No. 3	No. 4	No. 5	Sample	
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Hard red spring:							
1925	86, 832	36, 280	28, 471	14, 683	5, 042	5, 173	176, 481
1926	51, 160	29, 373	23, 823	17, 677	4, 114	10, 706	136, 853
1927	106, 285	56, 839	41, 268	18, 763	6, 200	11, 939	241, 294
1928	110, 602	36, 986	22, 562	8, 462	4, 625	40, 812	224, 049
Durum:							
1925	9, 733	28, 610	7, 975	4, 272	686	1, 568	52, 844
1926	2, 405	10, 548	6, 548	7, 764	1, 395	4, 403	33, 063
1927	11, 331	31, 170	9, 692	5, 567	2, 147	2, 414	62, 321
1928	5, 248	33, 789	14, 652	9, 169	5, 478	5, 508	73, 844
Hard red winter:							
1925	51, 498	92, 972	33, 812	9, 239	3, 918	3, 143	194, 582
1926	201, 893	145, 602	31, 067	10, 084	7, 821	10, 978	407, 445
1927	100, 264	123, 475	41, 434	19, 331	11, 127	14, 664	310, 295
1928	141, 045	168, 205	69, 541	28, 330	18, 914	16, 836	442, 871
Soft red winter:							
1925	8, 309	30, 939	10, 273	2, 877	1, 249	1, 463	55, 110
1926	35, 810	40, 147	11, 656	7, 903	2, 881	6, 011	104, 408
1927	10, 563	25, 795	13, 659	7, 942	2, 305	3, 371	63, 635
1928	8, 317	15, 856	7, 416	4, 924	1, 654	3, 967	42, 134
White:							
1925	5, 091	20, 435	11, 816	3, 840	649	543	42, 374
1926	10, 981	25, 696	8, 215	1, 999	423	659	47, 973
1927	17, 822	25, 819	8, 733	3, 072	1, 370	3, 492	60, 308
1928	17, 412	19, 438	2, 791	650	228	322	40, 841
Mixed:							
1925	15, 119	24, 019	10, 115	4, 017	1, 533	1, 530	56, 333
1926	15, 877	20, 626	10, 011	7, 340	2, 597	6, 022	62, 473
1927	14, 807	22, 624	12, 042	5, 570	2, 453	3, 097	60, 593
1928	14, 150	23, 338	13, 111	8, 395	5, 621	4, 533	69, 148
Total:							
1925	176, 582	233, 255	102, 462	38, 928	13, 077	13, 420	577, 724
1926	318, 126	271, 992	91, 320	52, 767	19, 231	38, 779	792, 215
1927	261, 072	285, 722	126, 828	60, 245	25, 602	38, 977	798, 446
1928	296, 774	297, 612	130, 073	59, 930	36, 520	71, 978	892, 887

Bureau of Agricultural Economics. Compiled from reports of licensed inspectors through district offices of Federal grain supervision. See 1927, p. 752, Yearbook for data for earlier years.

Table 14.—*Wheat: Visible supply in the United States,*[1] *1909–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	12,771	12,611	15,514	28,589	37,820	41,688	37,949	36,638	34,461	37,558	33,771	24,795
1910	16,396	17,053	38,352	48,437	53,420	57,602	59,369	56,357	50,566	42,697	34,656	32,769
1911	29,639	46,389	54,581	61,500	73,792	81,215	81,501	70,748	66,982	59,826	48,022	35,994
1912	27,615	23,595	26,862	40,998	52,494	67,575	77,471	76,131	73,895	69,000	53,508	43,697
1913	34,420	43,198	51,980	61,485	66,663	72,061	74,854	71,264	66,191	59,931	49,327	33,662
1914	17,136	36,456	39,964	61,784	76,262	86,332	85,957	81,776	58,923	46,287	31,407	22,871
1915	10,734	9,361	12,679	22,498	33,338	60,678	80,150	77,834	73,748	66,691	57,658	52,512
1916	50,515	49,591	65,754	70,420	75,455	76,191	73,584	59,477	54,160	48,525	32,831	34,876
1917	19,901	11,692	10,315	13,072	22,855	29,633	26,476	20,436	15,484	10,180	6,656	4,379
1918	2,465	20,462	54,236	98,155	131,852	131,584	129,627	140,607	127,207	100,505	55,247	27,626
1919	10,873	25,968	65,479	95,550	107,783	101,058	85,117	68,494	58,632	51,909	47,756	41,233
1920	23,404	20,226	24,195	32,169	41,596	48,273	47,797	38,475	31,945	22,229	17,584	10,598
1921	9,966	28,727	47,159	62,758	62,767	53,507	56,776	48,802	46,714	42,287	36,644	31,497
1922	20,342	23,077	32,479	38,025	39,023	39,764	43,856	53,823	54,562	51,862	49,521	37,203
1923	29,403	40,526	63,922	72,930	79,034	82,269	84,030	75,111	72,914	66,739	50,383	48,686
1924	38,597	46,193	79,700	92,353	100,712	108,997	99,121	84,476	76,437	62,766	49,529	38,328
1925	29,285	34,041	39,800	56,639	52,394	52,686	59,244	52,730	48,105	38,173	33,798	23,170
1926	16,486	34,575	72,884	84,724	81,175	78,910	70,811	62,317	61,271	53,827	42,402	31,115
1927	25,516	37,533	71,908	88,755	98,675	100,013	94,336	83,720	77,949	73 220	66,184	52,460
1928	42,208	66,762	96,798	118,327	143,003	145,234	146,813	133,759	130,034	128,339	116,559	999,966
1929	95,684	145,504	196,886	205,778	209,426	198,557	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from Bradstreet's. Includes grain stored at approximately 50 interior and seaboard points of accumulation and grain in transit by canals and lakes; also Pacific coast stocks at Portland, Tacoma, and Seattle.

[1] Saturday nearest the 1st of each month.

Table 15.—*Wheat: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC WHEAT IN UNITED STATES[1]

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27	-------	-------	-------	-------	-------	-------	66,340	56,303	56,262	49,910	37,[illegible]	27,833
1927–28	21,052	33,677	62,042	78,811	89,684	91,589	88,581	79,152	72,858	68,791	61,957	48,286
1928–29	38,587	52,421	93,870	115,469	139,493	140,172	144,351	129,646	126,377	124,756	113,392	96,059
1929–30	90,442	136,423	186,847	198,211	202,461	198,926	-------	-------	-------	-------	-------	-------

UNITED STATES WHEAT IN CANADA

1926–27	-------	-------	-------	-------	-------	-------	1,067	549	437	378	746	1,344
1927–28	1,362	1,280	4,249	4,560	7,258	5,156	3,933	2,285	1,680	977	863	2,314
1928–29	2,506	2,258	2,546	3,295	8,602	8,280	7,328	3,930	2,139	1,586	1,738	4,865
1929–30	3,332	2,288	4,450	8,770	9,065	9,101	-------	-------	-------	-------	-------	-------

CANADIAN WHEAT IN UNITED STATES[2]

1926–27	-------	-------	-------	-------	-------	-------	23,394	14,500	9,532	6,650	10,724	16,749
1927–28	7,472	4,835	3,410	3,784	8,617	31,375	35,764	28,703	19,260	11,848	6,597	11,549
1928–29	11,132	13,605	3,789	7,548	18,291	33,902	46,717	38,327	32,851	23,854	28,772	25,538
1929–30	23,196	23,550	22,025	21,753	28,316	34,527	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes wheat in store in public and private elevators in 39 important markets and also the wheat afloat in vessels or barges in the harbors of lake and seaboard ports. Wheat in transit either by rail or water, mill stocks, or small private stocks of wheat intended only for local purposes, not included.

[2] Includes wheat stored at lake and seaboard ports, exclusive of wheat in transit on lakes and canals.

TABLE 16.—*Wheat: Supply and distribution and per capita disappearance in the United States averages 1899–1925, annual 1926–1929*

Item	Year beginning July							
	Average 1899–1908	Average 1909–1913	Average 1914–1920	Average 1921–1925	1926	1927	1928	1929
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Supply:								
Stocks on farms, July 1 [1]	46,423	28,872	32,631	37,059	20,982	27,222	23,729	45,483
Stocks in country mills and elevators, July 1 [2]	27,000	29,600	26,997	30,991	29,501	21,776	19,277	40,136
Commercial visible (Bradstreet's) July 1	31,817	24,168	19,290	25,519	16,486	25,516	42,208	95,684
Stocks of flour (in terms of wheat) July 1 [2]	7,709	8,305	8,606	8,676	9,757	9,076	9,019	13,541
In merchant mills and elevators [3]					24,505	37,038	31,920	48,279
In transit to commercial mills [3]					7,350	11,274	10,893	16,237
New crop [1]	677,927	690,108	844,605	804,148	831,040	878,374	914,876	806,508
Imports (flour included) July 1 to June 30 [4]	753	1,834	19,806	17,473	13,264	15,734	21,442	
Total supply	791,629	782,287	951,935	923,866	952,885	1,026,010	1,073,364	
Distribution:								
Exports (flour included) July 1 to June 30 [4]	156,435	107,103	257,030	207,237	219,160	206,259	163,670	
Reexports July 1 to June 30 [4]	399	195	562	221	98	53	55	
Shipments (flour included) to Alaska, Hawaii, and Porto Rico [4]	[5] 2,034	2,549	2,546	2,836	3,082	2,690	72	
Estimated seed requirements [6]	70,444	72,326	88,312	86,849	88,919	95,739	88,043	
Carryover on June 30—								
On farms [1]	40,654	32,485	36,127	29,912	27,222	23,729	45,483	
In country mills and elevators [2]	25,400	31,600	26,449	31,457	21,776	19,277	40,136	
Commercial visible (Bradstreet's)	28,668	25,326	18,265	26,822	25,516	42,208	95,684	
Flour (in terms of wheat) [2]	7,374	8,935	8,290	9,240	9,076	9,019	13,541	
In merchant mills and elevators [3]					37,038	31,920	48,279	
In transit to commercial mills [3]					11,274	10,893	16,237	
Accounted for distribution	331,408	280,519	437,581	394,575	443,161	441,787	511,200	
Disappearance including food and feed	460,221	501,768	514,354	529,291	509,724	584,223	562,164	
Population, Jan. 1 (thousands) [7]	82,614	94,378	102,880	112,696	117,882	119,320	([8])	
Per capita disappearance, including food and feed, bushels	5.6	5.3	5.0	4.7	4.3	4.9		

Bureau of Agricultural Economics. Compiled as follows:

[1] Based on returns to the bureau from crop reporters.
[2] From Chicago Daily Trade Bulletin. Stocks in country mills and elevators, from 1899–1918 are stocks in second hands less visible supply on July 1, as given by Chicago Daily Trade Bulletin; subsequently same as Note 1.
[3] Bureau of the Census figures raised to represent all merchant mills.
[4] From reports of Foreign and Domestic Commerce of the United States.
[5] Seven years' average.
[6] Amount of seed used per acre from returns to the bureau from inquiries sent to crop reporters.
[7] Bureau of the Census.
[8] No official figure available.

TABLE 17.—*Wheat: Production, inspections for exports, and weighted average price per bushel of representative grades by classes, 1923–1929*

Year beginning July	Hard red spring	Durum	Hard red winter	Soft red winter	White [2]	Mixed [3]	Flour as wheat	Other wheat [4]	Total
	Estimated production [1]								
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923	126,876	55,269	241,851	271,631	101,767				797,394
1924	192,341	66,105	364,662	189,441	51,879				864,428
1925	156,053	65,008	205,799	169,792	79,777				676,429
1926	120,834	47,478	360,440	228,886	73,402				831,040
1927	201,927	83,162	317,042	180,887	95,356				878,374
1928	203,071	102,286	384,014	139,665	85,840				914,876
1929	140,176	56,924	341,069	189,831	78,508				806,508
	Inspections of United States wheat for export								
1923	1,022	4,908	19,640	9,810	18,653	5,435	81,087	19,325	159,880
1924	16,760	5,945	90,840	6,944	10,063	9,386	65,313	55,552	260,803
1925	3,338	4,170	7,358	2,282	16,914	5,944	44,846	23,183	108,035
1926	1,829	611	66,874	29,980	26,615	1,398	62,910	28,943	219,160
1927	5,209	3,496	41,603	9,915	28,150	1,874	60,260	55,752	206,259
1928	1,766	1,045	30,660	2,782	14,710	1,473	60,556	50,678	163,670
	Average price per bushel [5]								
	Cents	*Cents*	*Cents*	*Cents*					
1923	124	106	105	107					
1924	158	156	135	159					
1925	165	144	163	169					
1926	151	155	135	138					
1927	141	132	135	149					
1928	126	113	112	139					

Bureau of Agricultural Economics. Estimated production by classes based on questionnaire surveys of local authorities; supplemented by judgment of cereal specialists. Inspections of United States wheat for export data furnished monthly by Federal grain supervision officers at the export markets. Inspections are made at the ports of export.

[1] Production estimates are based on the estimate of percentage classification by States as reported for 1920, 1923, and 1924; the percentages for 1921 and 1922 were interpolated from the 1920 and 1923 percentages. The estimated production for 1928 and 1929 is subject to revision.

[2] White wheat in the Pacific Northwest region consists of both spring and winter wheat; no attempt has been made to classify this wheat as other than white wheat, part of which is spring and part winter.

[3] Mixed wheats exported from Atlantic coast ports are estimated as approximately 70 per cent durum and the remainder as hard red spring; that exported from Gulf ports as approximately half and half hard and soft winter; and that exported from Pacific coast ports as approximately 90 per cent white and the remainder as hard and soft red winter wheats.

[4] Exports of wheat other than reported as "Federal inspected" including exports through Canada. These exports are not "Federal inspected" and are exported largely through the customs districts of Buffalo, Chicago, Duluth and Superior, Wisconsin, and Ohio.

[5] The representative grades and markets selected are No. 1 dark northern spring, Minneapolis; No. 2 amber durum, Minneapolis; No. 2 hard winter, Kansas City; and No. 2 red winter, St. Louis.

TABLE 18.—*Wheat, including flour: International trade, average 1910–1914, annual 1926–1929*

Country	Year ended June 30									
	Average 1910–1914		1926		1927		1928		1929 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	447	94, 286	372	320, 649	408	304, 948	476	305, 658	--------	422, 732
United States	1, 808	104, 967	15, 679	108, 035	13, 264	219, 160	15, 734	206, 259	21, 442	163, 687
Argentina	[1] 3	85, 220	15	99, 803	14	138, 240	2	178, 135	--------	[2] 215, 603
Australia	[1] 7	[1] 149, 732	3	77, 234	4	96, 584	--------	72, 962	--------	[2] 113, 285
British India	332	50, 821	1, 777	9, 618	2, 899	12, 598	2, 310	15, 668	27, 417	5, 678
Hungary	[3] 7, 214	[3] 49, 116	34	19, 345	1	21, 143	2	22, 135	1	23, 658
Russia	[3] 556	[3] 164, 862	0	27, 085	0	49, 202	--------	--------	--------	--------
Yugoslavia	0	0	0	[4] 11, 549	--------	10, 029	--------	1, 024	27	7, 919
Rumania	[3] 196	54, 630	280	8, 558	[3] 1	[3] 11, 038	[3] 0	7, 431	--------	--------
Algeria	[3] 639	[3] 5, 936	[3] 1, 182	6, 007	[3] 3, 584	2, 182	[3] 1, 597	6, 351	--------	--------
Chile	[1] 170	[1] 2, 593	731	1, 696	758	516	622	585	--------	--------
Tunis	[3] 1, 746	[3] 960	611	3, 437	1, 142	1, 970	1, 127	629	--------	--------
Bulgaria	[3] 0	[3] 11, 182	[3] 5	4, 128	[3] 1	2, 236	--------	2, 125	--------	--------
Spain	6, 009	71	1, 466	683	56	985	--------	--------	--------	--------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	219, 474	4, 493	201, 313	13, 420	226, 908	10, 292	222, 270	11, 181	215, 140	11, 158
Italy	56, 431	3, 637	66, 339	2, 469	88, 184	1, 034	87, 796	1, 111	--------	--------
Germany	91, 851	23, 300	76, 410	20, 252	99, 252	5, 735	98, 557	6, 798	86, 162	17, 669
France	44, 081	1, 230	35, 978	1, 955	53, 878	592	53, 987	132	51, 553	116
Belgium	72, 877	21, 965	42, 722	3, 701	41, 236	1, 378	44, 848	2, 618	43, 796	2, 505
Netherlands	[3] 80, 702	[3] 58, 435	29, 150	1, 699	29, 060	867	31, 532	586	29, 529	709
Brazil [5]	20, 495	0	27, 452	22	31, 143	38	32, 216	3	36, 138	--------
Japan	[3] 4, 116	[3] 28	27, 980	4, 899	18, 458	4, 014	21, 995	4, 859	28, 203	768
China [5]	6, 691	5, 401	10, 162	1, 343	22, 354	374	15, 464	1, 464	--------	--------
Czechoslovakia	0	0	19, 388	212	21, 085	89	21, 323	41	17, 248	56
Austria	[3] 11, 402	[3] 871	14, 822	[6] 171	16, 888	89	16, 230	165	--------	--------
Switzerland	[3] 16, 937	[3] 14	14, 245	0	17, 220	0	18, 427	0	15, 496	0
Greece	[1] 7, 035	[1] 2	18, 003	0	19, 502	0	19, 106	0	22, 144	0
Irish Free State	0	0	18, 539	90	19, 511	37	18, 691	56	17, 930	--------
Sweden	[3] 7, 080	[3] 23	6, 677	639	8, 484	2, 576	10, 391	1, 660	10, 553	3, 076
Egypt	[3] 8, 244	[3] 59	12, 520	26	8, 861	64	6, 803	433	12, 906	181
Denmark	[3] 7, 155	[3] 597	6, 886	897	7, 695	1, 085	10, 701	220	17, 149	110
Poland	0	0	3, 460	5, 080	8, 331	833	7, 840	225	3, 865	106
Union of South Africa	[1] 6, 274	[1] 253	6, 063	15	4, 110	8	8, 212	8	--------	--------
Norway	[3] 3, 674	[3] 0	6, 346	[3] 5	5, 944	[3] 4	6, 862	[3] 4	8, 538	--------
Cuba	4, 248	0	5, 773	0	5, 695	0	5, 740	0	--------	--------
Finland	[1] 4, 912	[1] 0	4, 879	0	4, 854	0	5, 499	0	6, 095	0
New Zealand	[1] 163	[1] 918	2, 978	1	2, 769	1	1, 032	1	793	2
Syria and Lebanon [4]	0	0	3, 168	0	1, 980	0	--------	--------	--------	--------
Latvia	0	0	[4] 1, 579	[3] 2	[4] 1, 690	[3] 50	--------	--------	--------	--------
Indo-China	0	0	[4] 1, 094	[4] 0	[4] 1, 143	[4] 0	1, 073	0	--------	--------
Estonia	0	0	952	0	902	0	1, 062	0	1, 176	0
Ceylon [4]	0	0	896	0	927	0	--------	--------	--------	--------
Total 42 countries	692, 969	795, 602	687, 929	754, 725	790, 196	899, 991	789, 527	850, 527	673, 301	989, 018

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] Average of calendar years, 1909–1913.
[2] Trade sources.
[3] Year ended July 31, International Yearbook of Agricultural Statistics.
[4] International Crop Report and Agricultural Statistics.
[5] Year ended Dec. 31.
[6] International Yearbook of Agricultural Statistics.

TABLE 19.—*Wheat, all: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr 15	May 15	June 15	Weighted average
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
1909	114.0	101.2	94.9	97.2	99.2	101.0	104.2	105.0	104.8	102.2	98.8	96.4	100.7
1910	97.1	97.4	94.8	92.1	89.4	88.4	89.2	87.6	84.6	84.2	85.4	85.3	91.7
1911	83.5	83.8	86.6	90.0	89.4	87.7	89.2	90.6	91.6	96.1	101.2	100.9	88.3
1912	94.4	87.8	84.6	83.6	79.7	76.1	78.0	80.2	79.8	80.0	81.8	82.0	83.3
1913	79.2	77.1	77.5	77.4	78.4	80.4	81.3	82.4	83.6	84.0	84.2	80.6	79.3
1914	76.7	84.9	93.4	95.4	97.9	103.2	118.8	131.8	132.6	135.6	135.6	117.2	99.4
1915	104.6	100.8	93.0	92.0	92.5	97.4	108.4	108.4	100.8	100.6	101.2	96.5	98.2
1916	100.0	119.2	133.8	147.4	159.4	155.3	157.6	164.6	172.2	213.0	247.2	234.3	144.4
1917	224.5	219.3	205.2	200.3	200.4	201.4	201.6	202.0	202.6	203.1	203.0	202.8	205.8
1918	203.8	205.0	205.7	205.9	205.1	204.5	206.2	207.8	211.1	222.6	229.8	225.2	206.3
1919	219.6	211.4	207.6	211.4	214.0	223.4	233.8	231.2	230.3	242.6	250.8	256.0	218.6
1920	242.9	225.4	216.5	201.2	165.8	146.4	149.2	148.2	140.4	122.1	119.0	119.8	182.9
1921	108.5	103.0	103.4	99.9	93.4	93.0	95.2	107.0	117.0	119.0	118.8	109.6	104.4
1922	99.8	92.6	89.2	94.1	99.4	103.2	104.6	104.4	106.0	108.4	108.2	100.8	98.0
1923	89.6	86.4	91.0	94.2	93.7	94.5	96.7	98.0	98.8	95.8	96.8	98.5	92.4
1924	105.8	116.8	114.2	129.7	133.6	141.1	162.1	169.8	164.0	140.5	149.1	152.7	127.8
1925	140.3	150.4	144.4	136.4	148.8	153.7	158.1	155.5	146.0	142.2	142.1	138.9	145.9
1926	127.7	125.1	117.7	121.4	123.6	122.8	122.2	122.8	120.9	117.2	123.2	130.1	123.8
1927	127.3	123.5	119.2	113.7	111.4	113.9	115.2	116.2	121.6	129.2	144.3	132.0	120.5
1928	118.1	95.2	94.4	98.7	97.1	98.2	98.5	104.2	104.7	99.8	90.1	86.8	100.1
1929	102.4	110.7	112.1	111.5	103.4	108.1	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of wheat for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923.

TABLE 20.—*Wheat: Weighted average price [1] per bushel of reported cash sales of all classes and grades, six markets combined, 1923–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average [2]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1923	99.0	101.8	106.8	110.4	105.7	105.0	110.3	111.8	111.6	109.9	110.5	116.6	107.0
1924	125.7	123.5	128.3	144.8	148.2	163.6	188.8	184.8	172.1	150.8	165.5	161.6	145.3
1925	155.7	160.5	144.8	143.3	153.5	165.7	170.3	164.8	154.9	156.0	153.8	151.6	155.0
1926	141.6	135.3	135.6	139.4	137.7	139.5	138.8	136.2	133.6	134.7	145.1	148.6	138.3
1927	138.7	136.4	128.7	125.1	125.6	128.0	131.0	132.0	136.6	150.7	151.4	141.8	132.9
1928	126.0	109.4	108.9	107.0	109.1	107.4	113.7	118.1	114.2	109.2	101.1	105.3	110.6
1929	130.2	125.7	127.4	123.7	121.2	123.5	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Compiled from daily trade papers of markets named. The markets are Chicago, Minneapolis, Kansas City, St. Louis, Omaha, and Duluth.

[1] The prices in this table are comparable with prices paid to producers, in that the latter are averages of the several prices reported which cover all classes and grades sold by producers.
[2] Average of daily prices weighted by car-lot sales.

TABLE 21.—*Wheat: Weighted average price*[1] *per bushel of reported cash sales, 1910–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average[1]
NO. 1 NORTHERN SPRING, MINNEAPOLIS													
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	121	113	109	108	104	103	106	102	98	96	99	97	105
1911	99	105	109	110	105	102	106	106	108	110	116	113	107
1912	109	98	89	90	84	82	89	87	85	88	91	92	87
1913	91	88	87	84	85	86	87	93	92	91	94	92	88
1914	92	110	112	111	118	120	138	152	149	158	158	135	120
1915	144	118	97	102	102	114	129	126	114	122	122	111	109
1916	121	164	164	179	195	179	193	186	203	238	296	273	176
1917	266	247	217	217	217	217	217	217	217	217	217	217	220
1918	217	223	223	219	222	222	221	224	236	256	259	248	225
1919	266	259	256	267	285	307	301	267	284	306	309	293	272
1920	288	256	254	216	179	166	179	172	166	153	157	169	207
1921	167	148	151	134	125	131	134	151	151	158	161	149	143
1922	149	111	110	115	123	125	123	126	124	130	128	117	120
1923	112	118	121	120	114	116	119	121	121	121	122	125	117
1924	137	131	130	146	148	166	189	187	171	150	167	164	156
1925	159	164	150	149	155	169	173	167	161	164	162	163	161
1926	172	149	143	149	146	146	143	142	139	138	147	149	146
1927	147	143	134	129	130	132	135	134	139	153	157	148	136
1928	138	119	119	116	116	115	121	128	125	120	111	115	118
1929	143	135	135	131	128	131	------	------	------	------	------	------	------
NO. 2 RED WINTER, ST. LOUIS													
1910	107	102	102	100	96	98	103	96	93	90	94	88	99
1911	84	88	94	100	96	97	102	101	104	113	121	111	94
1912	103	104	103	109	104	107	111	109	108	109	104	99	105
1913	85	88	94	93	94	95	96	95	95	94	96	84	89
1914	87	93	110	110	111	118	140	157	150	154	150	119	110
1915	117	114	114	121	116	123	134	130	117	122	120	110	120
1916	125	145	160	173	187	183	196	188	205	266	304	265	168
1917	236	232	215	215	215	215	215	215	215	215	215	215	223
1918	221	221	219	222	222	232	241	238	255	271	260	241	223
1919	222	220	221	224	229	248	270	255	258	276	299	289	230
1920	273	251	258	226	202	199	202	190	166	141	158	150	213
1921	123	123	136	126	120	121	122	138	142	141	138	118	127
1922	112	109	114	123	129	136	137	139	136	139	133	123	121
1923	97	99	109	116	112	114	116	118	114	113	112	116	107
1924	135	138	140	156	163	179	210	202	186	177	186	189	159
1925	159	172	171	170	171	184	194	185	170	171	162	147	169
1926	142	134	136	140	136	137	138	135	130	129	142	150	138
1927	141	142	142	145	141	144	151	156	169	196	196	179	149
1928	147	138	145	144	145	139	142	140	135	125	117	121	139
1929	139	132	135	132	129	135	------	------	------	------	------	------	------
NO. 2 HARD WINTER, KANSAS CITY													
1910	104	100	99	95	91	93	95	90	88	88	90	88	98
1911	87	93	95	104	100	100	105	103	105	109	111	109	97
1912	92	89	88	88	83	84	87	86	86	88	87	88	88
1913	82	83	87	84	83	84	85	86	88	87	90	85	84
1914	78	91	104	102	108	113	134	154	149	154	150	121	105
1915	136	126	107	107	103	112	120	120	105	112	110	100	119
1916	114	141	157	167	185	172	189	182	197	243	301	274	171
1917	268	261	212	212	212	212	212	212	212	212	212	------	------
1918	220	216	216	216	215	224	231	226	239	262	260	247	219
1919	225	218	224	230	246	263	282	242	249	275	293	276	242
1920	268	245	244	207	176	169	172	162	155	133	147	138	183
1921	118	115	122	110	109	109	113	129	134	135	134	117	120
1922	113	104	104	113	117	117	114	115	116	120	116	104	113
1923	96	101	109	112	109	109	113	111	109	104	106	108	105
1924	120	119	120	137	143	162	182	181	171	151	163	160	135
1925	154	164	158	158	163	172	178	171	161	159	155	153	163
1926	137	131	132	139	137	138	137	135	133	131	142	144	135
1927	136	135	131	128	131	132	133	133	138	152	160	147	135
1928	120	106	107	110	112	111	114	118	116	110	101	105	112
1929	125	123	124	122	119	121	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record, St. Louis Daily Market Reporter, and Kansas City Grain Market Review, formerly Daily Price Current. Data, 1899–1908 available in 1924 Yearbook, pp. 582–583, Table 32.

[1] Average of daily prices weighted by car-lot sales.

TABLE 22.—*Wheat, No. 3 Manitoba Northern: Average cash price per bushel at Winnipeg, in terms of United States money, 1909–1929* [1]

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	124	102	94	94	94	94	99	98	100	98	91	87	98
1910	102	102	97	89	85	84	88	86	85	86	90	90	90
1911	91	95	95	94	90	85	87	89	91	96	97	100	93
1912	99	100	91	87	78	74	76	78	80	85	87	90	85
1913	89	88	82	77	80	78	81	85	87	86	91	89	84
1914	87	103	105	104	111	111	131	148	144	153	152	121	122
1915	127	125	89	92	96	103	116	117	104	109	111	105	108
1916	112	142	155	166	186	167	172	161	177	219	264	239	180
1917	228	235	215	214	215	215	213	213	212	211	212	211	216
1918	213	211	213	213	214	214	213	213	213	212	211	211	213
1919	210	220	247	247	245	238	234	221	229	235	281	226	232
1920	225	232	240	202	179	160	162	160	161	149	160	160	183
1921	156	150	125	100	93	94	95	118	124	126	130	117	119
1922	120	107	95	96	105	104	103	105	105	113	111	108	106
1923	99	103	96	89	87	83	86	90	88	89	92	105	92
1924	126	134	136	150	153	161	184	187	167	149	174	162	157
1925	153	160	132	120	136	149	146	144	138	146	144	144	143
1926	149	138	133	136	131	123	123	127	130	133	146	149	135
1927	153	145	131	127	124	124	123	124	131	141	142	130	133
1928	120	108	106	111	111	109	112	120	119	115	107	112	113
1929	152	152	144	134	126	130	-----	-----	-----	-----	-----	-----	-------

Bureau of Agricultural Economics. Compiled as follows: July, 1909–August, 1916, Winnipeg Farmers Advocate; September, 1916–June, 1920, annual reports of the Winnipeg Grain Exchange; July, 1921-July, 1928, Reports on the Grain Trade of Canada; August, 1928 to latest date shown, Minneapolis Daily Market Record. Conversions at current rate of exchange January, 1917–March, 1925. Exchange rates used are: January, 1917–June, 1919, mean of the monthly low and high, compiled from the Commercial and Financial Chronicle; July, 1919–March, 1925, monthly averages as reported by the Federal Reserve Board.

[1] Average of daily cash closing prices, basis, in store at Fort William and Port Arthur. Prices fixed by the Government Sept. 12, 1917–Aug. 17, 1920.

TABLE 23.—*Wheat: Average spot price per bushel of imported wheat at Liverpool, 1914–1929*

IMPORTED RED

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1914	165	128	129	128	138	147	167	195	191	194	198	165	157
1915	163	161	167	171	159	173	194	190	209	193	171	155	175
1916	158	196	200	215	222	239	239	243	242	246	246	216	224
1917	250	250	238	226	226	226	232	232	239	232	232	232	235
1918	232	232	232	239	246	246	246	246	243	241	241	239	240
1919	229	221	216	216	211	195	190	175	211	237	234	240	215
1920	234	220	213	234	253	230	233	214	213	213	217	[1] 196	223
1921	[1] 171	[1] 159	[1] 156	[1] 131	[1] 126	[1] 137	144	166	162	158	160	143	151
1922	152	137	132	148	148	148	148	143	140	145	149	138	144
1923	138	132	125	126	126	125	126	(2)	128	123	125	126	------
1924	143	160	163	176	179	189	210	214	198	175	184	182	181
1925	176	188	180	166	171	189	183	181	164	167	173	172	176

PARCELS

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
1926	167	162	160	171	171	163	160	157	155	156	165	165	163
1927	161	160	151	149	147	148	149	146	151	159	155	147	152
1928	141	126	126	129	129	126	131	135	131	125	116	117	128
1929	141	142	137	136	125	141	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Price per bushel of 60 pounds, good average imported red, July, 1914–June, 1926, compiled from Broomhall's 1921, 1925, and 1927 Corn Trade Yearbooks. Price per bushel of 60 pounds July, 1926, to date, compiled from Broomhall's Corn Trade News. These prices are simple averages of daily sales prices of parcels at Liverpool. Conversions at par beginning with January, 1926. Prior to that date conversions were made at monthly average rate of exchange as given in Federal Reserve Bulletins.

[1] No. 2 hard winter when available, otherwise No. 2 red winter.
[2] No quotations.

TABLE 24.—*Wheat ground in United States mills, census years, 1879–1927*

Year	Merchant mills	Custom mills	All mills	Year	Merchant mills	Custom mills	All mills
	1,000 bush.	*1,000 bush.*	*1,000 bush.*		*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1879			304, 776	1919	612, 563	6, 105	618, 668
1889			385, 750	1921	521, 234	[3] 6, 105	527, 339
1899	471, 307	[1] 18, 607	489, 914	1923	538, 312	[3] 6, 105	544, 417
1904	494, 095	[2] 6, 988	501, 083	1925	530, 593	[3] 6, 105	536, 698
1909	496, 480	6, 988	503, 468	1927 [4]	544, 054	[3] 6, 105	550, 159
1914	545, 728	[2] 6, 988	552, 716				

Bureau of Agricultural Economics. Rearranged from reports of the Bureau of the Census, as follows: 1879 from 1880 Census of Manufactures, p. 451; 1889 from 1900 Census of Manufactures, Vol. IX, part 3, p. 365; 1899 and 1904 from 1910 Census of Manufactures, Vol. X, p. 415; 1909, 1914, and 1919 from 1919 Census of Manufactures, Vol. X, p. 110; 1921 from 1923 Biennial Census of Manufactures; 1923 and 1925 from 1925 Biennial Census of Manufactures; 1927 from release of Census of Manufactures, Mar. 6, 1929.

[1] Difference between all mills and merchant mills.
[2] 1909 custom mills.
[3] 1919 custom mills.
[4] Preliminary.

TABLE 25.—*Flour, wheat, spring patents: Average wholesale price per barrel,*[1] *Minneapolis, 1909–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	6. 21	5. 89	5. 14	5. 29	5. 22	5. 48	5. 58	5. 45	5. 52	5. 38	5. 42	5. 33	5. 49
1910	6. 20	5. 79	5. 75	5. 21	5. 03	5. 01	5. 28	4. 91	4. 75	4. 64	4. 89	4. 81	5. 19
1911	4. 88	4. 88	4. 98	5. 25	5. 05	5. 05	5. 00	5. 10	5. 10	5. 10	5. 43	5. 60	5. 12
1912	5. 43	5. 24	4. 68	4. 63	4. 59	4. 13	4. 26	4. 43	4. 43	4. 43	4. 43	4. 63	4. 61
1913	4. 66	4. 57	4. 45	4. 33	4. 18	4. 15	4. 26	4. 52	4. 54	4. 51	4. 51	4. 51	4. 43
1914	4. 62	5. 78	6. 02	5. 58	5. 79	6. 01	6. 86	7. 54	7. 16	7. 61	7. 41	6. 78	6. 43
1915	6. 78	6. 42	5. 13	5. 23	5. 28	5. 98	6. 23	6. 13	5. 70	5. 90	5. 79	5. 29	5. 82
1916	5. 68	7. 69	8. 26	9. 08	9. 56	8. 60	9. 00	8. 45	9. 44	11. 33	14. 09	13. 08	9. 52
1917	12. 86	13. 22	11. 15	10. 84	10. 24	10. 07	9. 85	10. 05	9. 89	9. 90	9. 42	9. 89	10. 62
1918	10. 45	10. 53	10. 49	10. 44	10. 41	10. 44	10. 42	10. 69	11. 22	12. 09	12. 52	12. 00	10. 98
1919	12. 15	12. 13	11. 54	12. 03	13. 20	14. 48	14. 97	13. 73	13. 41	14. 69	15. 49	14. 64	13. 54
1920	14. 12	13. 33	13. 02	11. 45	9. 74	9. 28	9. 94	9. 38	9. 10	8. 30	9. 04	9. 40	10. 51
1921	9. 27	8. 34	8. 62	7. 67	7. 39	7. 26	7. 33	8. 17	8. 27	8. 46	8. 32	7. 71	8. 07
1922	7. 95	7. 22	6. 68	6. 76	6. 88	6. 86	6. 71	6. 72	6. 72	7. 00	6. 80	6. 35	6. 89
1923	6. 21	6. 37	6. 45	6. 43	6. 21	6. 30	6. 44	6. 51	6. 49	6. 56	6. 83	7. 12	6. 49
1924	7. 72	7. 69	7. 52	8. 19	8. 22	9. 03	9. 80	10. 02	9. 34	8. 54	9. 12	8. 86	8. 67
1925	8. 78	9. 04	8. 52	8. 52	8. 81	9. 52	9. 85	9. 46	9. 19	9. 20	9. 00	9. 32	9. 10
1926	9. 27	8. 50	7. 87	8. 08	7. 85	8. 02	7. 95	7. 85	7. 74	7. 75	8. 23	8. 39	8. 12
1927	8. 26	7. 98	7. 52	7. 43	7. 38	7. 37	7. 48	7. 47	7. 88	8. 48	8. 68	8. 36	7. 86
1928	7. 92	7. 20	7. 16	6. 89	6. 79	6. 64	6. 84	7. 27	7. 29	7. 22	6. 82	6. 94	7. 08
1929	8. 57	8. 10	7. 94	7. 53	7. 44	7. 69	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record.

[1] In 98-pound cotton sacks.

TABLE 26.—*Bread: Average retail price per pound (baked weight) in leading cities of the United States, 1913–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1913	5.6	5.6	5.6	5.6	5.6	5.6	6.2	6.2	6.2	6.2	6.2	6.2	5.9
1914	6.2	6.3	6.4	6.4	6.4	6.5	6.8	7.1	7.1	7.1	7.2	7.2	6.7
1915	7.1	7.1	7.0	7.0	6.9	6.9	6.9	7.0	7.0	7.0	7.0	7.0	7.0
1916	7.0	7.1	7.7	8.1	8.4	7.8	7.9	8.0	8.1	8.4	9.5	9.6	8.1
1917	9.9	10.2	9.9	9.9	9.9	9.3	9.4	9.5	9.6	9.8	9.9	10.0	9.8
1918	10.0	9.9	9.9	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.8	9.9	9.8
1919	10.0	10.1	10.1	10.1	10.2	10.2	10.9	11.1	11.2	11.2	11.5	11.8	10.7
1920	11.9	11.9	11.9	11.8	11.6	10.8	10.8	10.6	10.5	10.3	9.9	9.8	11.0
1921	9.7	9.7	9.6	9.5	9.3	9.1	8.8	8.6	8.7	8.7	8.8	8.8	9.1
1922	8.8	8.7	8.7	8.7	8.7	8.6	8.7	8.7	8.7	8.7	8.7	8.7	8.7
1923	8.8	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7
1924	8.7	8.8	8.8	8.8	8.9	8.9	9.2	9.5	9.4	9.4	9.4	9.4	9.1
1925	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4
1926	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.4	9.3	9.4
1927	9.3	9.3	9.3	9.3	9.3	9.2	9.2	9.2	9.1	9.1	9.1	9.2	9.2
1928	9.2	9.2	9.1	9.1	9.1	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.1
1929	9.0	9.0	9.0	8.9	8.9	8.9	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports of retail prices, monthly.

TABLE 27.—*Bran, standard: Average wholesale price per ton in 100-pound sacks, Minneapolis, 1920–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	45.52	41.86	38.42	30.62	31.30	26.41	25.93	21.44	21.63	16.41	15.97	14.80	27.53
1921	14.06	13.91	12.95	12.15	14.79	20.63	20.98	24.75	23.85	22.29	20.91	15.35	18.05
1922	15.31	14.06	16.88	21.81	22.65	24.09	25.99	27.34	28.22	27.74	26.75	20.83	22.64
1923	19.84	23.62	27.79	28.07	25.65	24.77	24.98	23.66	22.00	20.84	17.66	19.12	23.17
1924	22.27	23.43	23.00	24.66	25.62	30.43	30.14	24.49	23.45	23.46	26.84	26.34	25.34
1925	23.78	24.20	23.09	22.83	25.73	26.34	26.17	23.68	22.24	25.05	23.30	21.31	23.96
1926	22.02	21.69	21.64	21.33	23.14	26.02	26.48	27.64	26.96	27.31	28.43	26.51	24.93
1927	25.13	26.85	25.88	25.96	28.41	30.09	30.66	32.47	35.68	34.28	35.03	29.68	30.01
1928	27.29	24.12	25.49	28.09	30.82	31.69	30.54	28.64	26.88	22.93	22.38	22.56	26.79
1929	26.17	26.44	29.19	28.21	27.90	27.66	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record.

TABLE 28.—*Middlings, standard: Average wholesale price per ton, in 100-pound sacks, Minneapolis, 1909–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	21.20	20.72	19.03	18.92	18.78	20.19	22.36	22.03	20.95	18.48	18.79	18.06	19.96
1910	21.59	21.94	19.76	19.40	20.84	22.10	21.94	21.30	20.34	20.92	21.40	20.79	21.03
1911	22.18	23.92	24.59	23.60	23.25	22.77	23.54	25.25	25.00	24.29	23.95	22.81	23.76
1912	23.90	22.88	22.28	20.51	18.37	18.60	19.65	18.96	17.39	16.62	17.04	18.73	19.58
1913	18.79	21.11	23.35	22.23	21.64	20.67	21.27	21.75	22.63	23.04	22.17	21.83	21.71
1914	21.20	24.27	23.25	20.52	20.90	21.88	23.10	22.67	21.22	23.12	22.69	22.68	22.29
1915	25.08	25.51	19.86	18.66	18.00	18.45	19.42	21.61	20.22	19.50	20.06	20.10	20.54
1916	19.88	21.48	22.59	27.19	30.81	27.88	28.83	32.55	34.20	39.56	36.09	33.24	29.52
1917	41.71	41.94	35.10	36.25	37.40	39.05	34.50	34.50	34.85	35.04	33.27	32.69	36.36
1918	27.91	31.00	30.89	30.77	30.09	36.27	48.84	44.14	38.58	40.74	44.81	42.92	37.25
1919	47.16	53.08	51.65	44.46	41.33	43.17	43.97	47.28	51.60	54.94	57.74	55.89	49.36
1920	54.22	52.12	45.79	30.58	28.86	23.94	23.47	20.91	20.87	15.38	15.29	14.83	28.86
1921	14.07	14.64	13.95	13.16	15.32	20.73	20.51	24.76	25.52	23.21	21.20	17.13	18.68
1922	17.30	16.24	18.03	23.06	23.23	23.73	25.81	27.26	28.11	27.79	28.85	25.69	23.76
1923	24.83	25.89	27.85	27.78	25.13	23.80	25.43	23.95	21.65	20.96	18.00	19.92	23.78
1924	24.46	25.68	25.27	26.64	27.99	31.44	33.08	26.09	23.62	24.28	29.07	29.68	27.28
1925	25.53	26.95	26.37	24.19	26.31	25.28	26.10	23.71	22.03	24.20	21.77	21.60	24.50
1926	22.96	23.01	22.67	22.31	24.16	27.38	27.35	28.61	28.46	27.79	29.13	29.10	26.08
1927	31.42	34.46	29.22	26.88	28.72	30.00	30.52	32.71	35.85	34.33	37.14	35.30	32.21
1928	32.18	24.31	27.44	28.61	31.01	31.21	30.46	28.31	26.28	22.76	21.98	22.64	27.27
1929	28.42	29.25	32.66	32.08	28.76	28.00	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record.

TABLE 29.—*Wheat futures: Volume of trading in all "contract" markets, by months, 1924–25 to 1928–29*

Year and market	July	August	September	October	November	December
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1924–25	1, 332, 893	1, 300, 002	1, 068, 406	1, 595, 688	1, 339, 778	1, 528, 039
1925–26	1, 459, 986	1, 560, 407	1, 474, 886	1, 572, 648	1, 500, 362	2, 349, 337
1926–27	1, 437, 934	1, 226, 243	1, 155, 528	1, 089, 629	1, 227, 061	972, 477
1927–28	1, 017, 662	1, 144, 500	923, 046	917, 756	837, 630	542, 803
1928–29	996, 026	1, 133, 390	818, 098	915, 667	749, 635	517, 034
Chicago Board of Trade	829, 797	919, 034	628, 301	714, 916	542, 958	417, 146
Chicago Open Board	29, 295	31, 678	23, 573	31, 256	23, 093	17, 755
Minneapolis	44, 663	84, 329	77, 964	84, 305	84, 896	38, 657
Kansas City	75, 629	74, 399	33, 094	32, 301	48, 253	21, 214
Duluth	11, 490	18, 150	51, 490	48, 970	46, 296	18, 769
St. Louis	2, 994	2, 391	1, 388	1, 454	2, 033	1, 540
Milwaukee	1, 491	1, 871	1, 698	2, 070	1, 505	1, 404
Seattle	667	1, 538	590	395	601	549

Year and market	January	February	March	April	May	June	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1924–25	1, 908, 039	1, 780, 769	2, 273, 124	1, 482, 231	1, 507, 950	1, 759, 046	18, 875, 965
1925–26	1, 455, 699	1, 284, 398	1, 864, 396	1, 397, 092	1, 221, 904	1, 203, 900	18, 345, 015
1926–27	704, 178	580, 648	919, 793	846, 133	1, 260, 385	1, 163, 931	12, 583, 940
1927–28	384, 203	507, 925	922, 726	1, 590, 458	1, 471, 075	941, 234	11, 201, 018
1928–29	1, 084, 682	892, 596	1, 082, 838	1, 361, 610	1, 252, 770	1, 390, 688	12, 195, 034
Chicago Board of Trade	909, 187	743, 378	905, 276	1, 106, 146	1, 040, 212	1, 151, 259	9, 907, 610
Chicago Open Board	39, 186	32, 013	39, 529	42, 425	39, 322	38, 092	387, 217
Minneapolis	68, 923	57, 325	66, 920	98, 077	85, 353	95, 558	886, 970
Kansas City	42, 354	36, 929	42, 340	62, 303	48, 192	58, 797	575, 805
Duluth	18, 885	17, 047	22, 119	47, 218	34, 684	41, 497	376, 615
St. Louis	2, 763	3, 250	3, 738	2, 145	1, 898	1, 967	27, 561
Milwaukee	2, 956	2, 239	2, 540	2, 477	2, 385	2, 407	25, 043
Seattle	428	415	376	819	724	749	7, 851
Portland						362	362

Grain Futures Administration.

TABLE 30.—*Wheat futures: Volume of trading on the Chicago Board of Trade by crop years, 1921–22 to 1928–29*

Crop year	Bushels	Crop year	Bushels
1921–22	12, 814, 000, 000	1925–26	15, 869, 000, 000
1922–23	9, 625, 000, 000	1926–27	10, 619, 000, 000
1923–24	6, 124, 000, 000	1927–28	9, 203, 000, 000
1924–25	16, 587, 000, 000	1928–29	9, 907, 000, 000

Grain Futures Administration.

TABLE 31.—*Wheat: Amount of open commitments in the various futures on the Chicago Board of Trade shown semimonthly, June 30, 1928–June 30, 1929*

Date	Future					
	July	September	December	March	May	All futures
1928	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
June 30	16, 107	54, 902	16, 150			87, 159
July 14	2, 635	57, 214	23, 653			83, 502
July 31		57, 488	44, 604	2		102, 094
Aug. 15		42, 696	64, 199	2, 307	3, 125	112, 327
Aug. 31		18, 868	78, 457	4, 014	11, 400	112, 739
Sept. 15		7, 170	82, 610	4, 736	21, 636	116, 152
Sept. 29			77, 435	5, 660	27, 417	110, 512
Oct. 15			77, 257	7, 131	38, 787	123, 175
Oct. 31	10		71, 847	7, 249	45, 646	124, 752
Nov. 15	150		63, 506	8, 046	58, 018	129, 720
Nov. 30	235		28, 146	12, 261	91, 841	132, 503
Dec. 15	605		11, 503	13, 304	102, 549	127, 961
Dec. 31	2, 548			14, 232	112, 671	129, 451

TABLE 31.—*Wheat: Amount of open commitments in the various futures on the Chicago Board of Trade shown semimonthly, June 30, 1928–June 30, 1929*—Con.

Date	Future: July	September	December	March	May	All futures
1929	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Jan. 15	9,415	35	----------	11,909	94,919	116,278
Jan. 31	21,867	35	----------	9,073	85,342	115,317
Feb. 15	31,551	40	----------	6,745	89,314	127,650
Feb. 28	43,662	160	----------	5,926	92,033	141,781
Mar. 15	51,717	4,066	----------	1,579	88,533	145,925
Mar. 30	54,697	10,693	----------	----------	78,031	143,421
Apr. 15	61,424	20,656	1,021	----------	63,803	146,904
Apr. 30	74,117	31,758	8,458	----------	18,724	133,057
May 15	75,152	35,484	15,136	----------	1,302	127,074
May 31	67,106	43,481	23,434	----------	----------	134,021
June 15	46,361	49,077	30,039	----------	----------	125,477
June 29	12,698	83,621	43,363	----------	90	139,772

Grain Futures Administration. The maximum open commitments in all wheat futures was 155,199,000 bushels on Apr. 22, 1929. The minimum was 82,738,000 bushels on July 13, 1928.

TABLE 32.—*Rye: Acreage, production, value, exports, etc., United States, 1909–1929*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel of No. 2 rye at Minneapolis year beginning July 1 [1]	Foreign trade, including flour, year beginning July 1 [2]: Domestic exports	Imports	Net exports [3]: Total	Percentage of production
	1,000 acres	*Bushels of 56 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1909	*2,196*	*13.4*	*29,520*	--------	--------	--------	--------	--------	--------	--------
1909	2,196	16.1	35,406	72.2	25,548	70	242	30	212	.6
1910	2,185	16.0	34,897	71.5	24,953	77	40	227	[4] 187	.5
1911	2,127	15.6	33,119	83.2	27,557	86	31	134	[4] 103	.3
1912	2,117	16.8	35,664	66.3	23,636	60	1,855	1	1,854	5.2
1913	2,557	16.2	41,381	63.4	26,220	58	2,273	37	2,236	5.4
1914	2,541	16.8	42,779	86.5	37,018	98	13,027	147	12,880	30.1
1915	3,129	17.3	54,050	83.4	45,083	94	15,250	566	14,684	27.2
1916	3,213	15.2	48,862	122.1	59,676	135	13,703	428	13,275	27.2
1917	4,317	14.6	62,933	166.0	104,447	193	17,186	834	16,352	26.0
1918	6,391	14.2	91,041	151.6	138,038	158	36,467	638	35,829	39.4
1919	*7,679*	*9.9*	*75,992*	--------	--------	--------	--------	--------	--------	--------
1919	6,307	12.0	75,483	133.2	100,573	160	41,531	1,077	40,454	53.6
1920	4,409	13.7	60,490	126.8	76,693	161	47,337	452	46,885	77.5
1921	4,528	13.6	61,675	69.7	43,014	92	29,944	700	29,244	47.4
1922	6,672	15.5	103,362	68.5	70,841	75	51,663	99	51,564	49.9
1923	5,171	12.2	63,077	65.0	40,971	65	19,902	2	19,900	31.5
1924	*3,744*	*14.9*	*55,674*	--------	--------	--------	--------	--------	--------	--------
1924	4,156	15.8	65,520	106.4	69,742	114	50,242	1	50,241	76.7
1925	3,974	11.7	46,456	78.2	36,340	88	12,647	--------	12,646	27.2
1926	3,574	11.4	40,749	83.4	33,991	98	21,698	1	21,697	53.2
1927	3,648	15.9	58,164	85.3	49,609	104	26,346	2	26,345	45.3
1928	3,480	12.5	43,366	86.0	37,290	95	9,488	1	9,487	22.7
1929 [5]	3,225	12.6	40,629	87.1	35,371	--------	--------	--------	--------	--------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 764, for data for earlier years.

[1] Prices are from Minneapolis Daily Market Record and are averages of daily prices weighted by car-lot sales.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce. Rye—General imports, 1909; imports for consumption, 1910–1929. Rye flour—Imports for consumption, 1909–1929. Rye flour converted to rye on the basis that 1 barrel of rye flour is the product of 6 bushels of grain.

[3] Total exports (domestic plus foreign) minus total imports.

[4] Net imports.

[5] Preliminary.

TABLE 33.—*Rye: Acreage and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage					Production				
	Av., 1923–1927	1926	1927	1928	1929 [1]	Av., 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Connecticut	[2] 2	----	----	----	----	[2] 42	----	----	----	----
New York	36	25	21	20	20	598	388	368	314	310
New Jersey	47	41	36	41	49	854	779	720	758	931
Pennsylvania	126	93	86	103	124	2,105	1,488	1,462	1,596	1,984
North Atlantic	211	159	143	164	193	3,594	2,655	2,550	2,668	3,225
Ohio	56	50	35	30	57	888	875	560	399	889
Indiana	174	145	119	86	125	2,347	2,102	1,618	946	1,625
Illinois	111	83	62	62	75	1,630	1,245	899	899	1,088
Michigan	255	173	178	182	166	3,534	2,336	2,617	2,366	2,241
Wisconsin	285	256	238	167	185	4,476	3,840	4,046	2,171	2,960
Minnesota	570	440	383	421	396	9,161	5,940	7,009	6,315	6,930
Iowa	39	31	43	49	50	662	542	645	760	800
Missouri	22	24	16	19	20	269	310	176	228	200
North Dakota	1,376	1,222	1,381	1,298	935	15,807	9,287	23,063	14,278	8,415
South Dakota	197	103	154	162	186	2,404	639	2,772	1,458	2,046
Nebraska	211	253	274	249	262	2,712	2,606	4,110	3,486	3,694
Kansas	42	41	45	27	19	471	480	576	437	238
North Central	3,336	2,821	2,928	2,752	2,476	44,361	30,202	48,091	33,743	31,126
Delaware	4	4	3	3	4	64	60	45	45	58
Maryland	16	15	14	15	17	264	270	214	225	280
Virginia	40	43	42	46	53	485	580	496	621	625
West Virginia	10	12	8	7	8	120	156	104	94	93
North Carolina	85	104	94	89	98	964	1,352	1,128	1,024	1,176
South Carolina	8	8	9	7	7	91	112	117	80	88
Georgia	22	22	26	22	18	215	264	260	220	171
South Atlantic	184	208	196	189	205	2,203	2,794	2,364	2,309	2,491
Kentucky	17	18	14	7	15	208	279	154	87	165
Tennessee	23	32	26	25	32	255	448	208	205	256
Arkansas	1	1	1	1	1	10	11	10	9	9
Oklahoma	33	36	22	26	28	423	558	198	312	308
Texas	16	20	14	15	16	202	380	98	180	240
South Central	90	107	77	74	92	1,100	1,676	668	793	978
Montana	111	107	134	154	111	1,506	1,284	2,412	2,156	1,221
Idaho	5	3	3	3	3	90	46	48	48	42
Wyoming	46	51	54	40	40	565	714	675	400	360
Colorado	81	85	76	74	81	854	978	798	814	891
New Mexico	1	1	1	1	1	17	18	6	12	18
Utah	5	4	4	3	3	53	36	40	24	21
Washington	18	18	22	18	12	235	216	352	279	144
Oregon	15	10	10	8	8	215	130	160	120	112
Far Western	283	279	304	301	259	3,535	3,422	4,491	3,853	2,809
United States	4,105	3,574	3,648	3,480	3,225	54,793	40,749	58,164	43,366	40,629

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.
[2] 3-year average.

TABLE 34.—*Rye: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State and division	Yield per acre							Estimated price per bushel						
	Av., 1918–1927	1924	1925	1926	1927	1928	1929	Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Connecticut	[1] 19.2	18.0	19.0	-----	-----	-----	-----	-----	140	130	-----	-----	-----	-----
New York	16.4	17.0	16.5	15.5	17.5	15.7	15.5	102	113	100	100	105	112	114
New Jersey	18.1	17.5	18.0	19.0	20.0	18.5	19.0	98	113	93	95	97	104	103
Pennsylvania	16.5	16.0	17.0	16.0	17.0	15.5	16.0	102	113	105	97	105	107	106
North Atlantic	16.9	16.5	17.1	16.7	17.8	16.3	16.7	101.3	113.1	101.4	96.8	102.7	106.7	105.9
Ohio	15.5	16.0	15.0	17.5	16.0	13.3	15.6	91	111	88	88	92	103	98
Indiana	13.6	13.5	11.4	14.5	13.6	11.0	13.0	87	106	85	85	88	94	90
Illinois	15.7	14.5	13.8	15.0	14.5	14.5	14.5	90	107	90	86	92	92	89
Michigan	13.7	14.5	12.5	13.5	14.7	13.0	13.5	83	106	78	78	89	93	88
Wisconsin	15.6	17.0	14.8	15.0	17.0	13.0	16.0	85	109	76	84	90	90	89
Minnesota	16.9	22.0	13.0	13.5	18.3	15.0	17.5	79	108	71	76	85	85	82
Iowa	17.2	18.0	16.4	17.5	15.0	15.5	16.0	83	102	80	82	86	86	85
Missouri	12.3	13.5	12.0	12.9	11.0	12.0	10.0	107	105	120	113	110	106	107
North Dakota	11.3	15.0	10.0	7.6	16.7	11.0	9.0	74	104	65	73	80	76	76
South Dakota	13.8	14.0	9.5	6.2	18.0	9.0	11.0	74	102	67	73	79	79	76
Nebraska	13.1	14.5	12.3	10.3	15.0	14.0	14.1	75	97	71	76	77	77	76
Kansas	11.7	14.2	8.9	11.7	12.8	16.2	12.5	91	98	98	94	92	82	85
North Central	13.6	16.4	11.4	10.7	16.4	12.3	12.6	79.3	105.4	71.6	78.3	82.7	81.8	81.7
Delaware	14.0	13.5	15.0	15.0	15.0	15.0	14.5	113	125	120	110	115	120	115
Maryland	15.7	15.0	19.0	18.0	15.3	15.0	16.5	110	122	114	105	110	115	110
Virginia	11.9	11.5	12.0	13.5	11.8	13.5	11.8	118	128	127	112	115	120	120
West Virginia	12.2	11.2	13.0	13.0	13.0	13.5	11.6	114	129	120	110	110	115	116
North Carolina	9.8	9.0	11.5	13.0	12.0	11.5	12.0	140	149	157	125	135	145	140
South Carolina	11.1	11.0	10.5	14.0	13.0	11.5	12.5	185	190	210	175	175	185	190
Georgia	9.6	9.2	9.3	12.0	10.0	10.0	9.5	176	183	180	160	165	175	189
South Atlantic	11.4	10.5	12.3	13.4	12.1	12.2	12.2	134.2	143.8	144.5	124.6	132.3	137.9	135.2
Kentucky	12.1	11.0	13.0	15.5	11.0	12.4	11.0	117	127	125	108	120	132	122
Tennessee	9.8	11.0	11.0	14.0	8.0	8.2	8.0	127	138	130	120	129	138	133
Arkansas	10.3	11.0	11.0	11.0	10.0	9.0	9.0	129	131	130	125	140	140	135
Oklahoma	12.4	14.0	12.0	15.5	9.0	12.0	11.0	98	101	110	90	99	92	90
Texas	11.7	16.0	4.0	19.0	7.0	12.0	15.0	104	111	120	97	95	103	92
South Central	11.8	13.2	10.6	15.7	8.7	10.7	10.6	109.8	113.7	119.2	102.9	113.2	111.3	107.5
Montana	11.6	14.0	12.5	12.0	18.0	14.0	11.0	73	91	74	75	73	69	72
Idaho	15.6	10.0	20.0	15.5	16.0	16.0	14.0	84	122	80	73	75	72	85
Wyoming	14.2	10.0	12.0	14.0	12.5	10.0	9.0	71	88	64	67	69	72	68
Colorado	10.1	9.0	10.0	11.5	10.5	11.0	11.0	70	85	67	71	70	70	71
New Mexico	13.0	16.0	4.0	18.0	6.0	12.0	18.0	90	100	100	85	75	80	82
Utah	9.6	6.6	11.0	9.0	10.0	8.0	7.0	92	107	100	80	82	87	91
Washington	11.8	7.9	11.0	12.0	16.0	15.5	12.0	104	133	125	100	90	90	95
Oregon	12.6	10.0	14.0	13.0	16.0	15.0	14.0	106	136	110	96	95	102	115
Far Western	11.6	10.9	11.6	12.3	14.8	12.8	10.8	75.7	92.3	74.7	74.6	74.1	72.3	74.5
United States	13.6	15.8	11.7	11.4	15.9	12.5	12.6	83.7	106.4	78.2	83.4	85.3	86.0	87.1

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 8-year average.

TABLE 35.—*Rye: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual, 1927–1929*

Country	Acreage: Average, 1909–1913 [1]	Acreage: Average, 1921–1925	Acreage: 1927	Acreage: 1928	Acreage: 1929, preliminary	Yield per acre: Average, 1909–1913 [1]	Yield per acre: Average, 1921–1925	Yield per acre: 1927	Yield per acre: 1928	Yield per acre: 1929, preliminary	Production: Average, 1909–1913 [1]	Production: Average, 1921–1925	Production: 1927	Production: 1928	Production: 1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	117	1,386	743	840	992	17.9	14.4	20.1	17.4	13.3	2,094	19,994	14,951	14,618	13,161
United States	2,236	4,899	3,648	3,480	3,225	16.1	13.8	15.9	12.5	12.6	36,093	68,007	58,164	43,366	40,629
Total	2,353	6,285	4,391	4,320	4,217	16.2	14.0	16.7	13.4	12.8	38,187	88,001	73,115	57,984	53,790
EUROPE															
Norway	37	28	23	18	---------	26.3	27.9	26.3	27.6	---------	973	780	606	497	561
Sweden	977	836	683	682	631	24.7	26.2	22.2	25.1	25.9	24,100	21,911	15,144	17,152	16,373
Denmark	636	535	453	361	376	30.0	24.6	22.9	26.8	27.2	19,104	13,162	10,364	9,683	10,236
Netherlands	557	499	487	485	485	29.5	31.5	27.7	35.7	27.4	16,422	15,731	13,489	17,333	13,283
Belgium	672	559	573	572	567	35.2	36.8	38.1	40.5	35.0	23,644	20,564	21,854	23,154	19,865
Luxemburg	26	18	17	15	18	25.0	19.4	20.8	23.5	21.5	651	349	354	352	387
France	3,095	2,196	1,921	1,900	1,936	17.0	18.5	17.7	17.9	20.4	52,501	40,645	33,955	34,079	39,432
Spain	1,988	1,802	1,818	1,384	1,633	13.9	15.4	14.6	10.4	14.0	27,636	27,721	26,515	14,413	22,896
Portugal	[2] 271	604	618	589	---------	[2] 8.9	8.8	7.6	5.8	---------	[2] (2,300)	5,330	4,677	3,418	5,330
Italy	346	317	307	311	313	18.3	19.8	19.3	21.0	21.8	6,317	6,277	5,937	6,535	6,822
Switzerland	60	48	56	56	49	29.7	32.6	32.6	35.0	32.9	1,783	1,563	1,823	1,962	1,614
Germany	12,713	10,745	11,610	11,452	11,680	29.0	23.8	23.2	29.3	27.5	368,337	255,937	269,025	335,499	321,045
Austria	1,110	878	948	936	936	21.4	18.3	21.2	21.3	20.3	23,785	16,086	20,126	19,920	19,023
Czechoslovakia	2,605	2,128	2,012	2,487	2,690	24.4	24.5	24.5	28.2	23.6	63,538	52,200	49,296	70,047	63,595
Hungary	1,608	1,591	1,583	1,608	1,605	19.5	16.9	14.1	20.3	20.5	31,377	26,845	22,365	32,587	32,947
Yugoslavia	732	477	516	496	600	12.3	12.6	11.5	15.2	13.8	9,004	6,001	5,923	7,527	8,269
Greece	76	84	117	137	144	14.9	12.5	12.9	12.6	8.9	1,129	1,051	1,505	1,731	1,287
Bulgaria	542	443	464	479	525	15.4	13.2	15.0	19.2	16.3	8,345	5,831	6,951	9,220	8,538
Rumania	[3] 1,286	692	695	686	766	[3] 16.1	12.1	13.4	16.7	17.1	[3] 20,644	8,371	9,323	11,483	13,084
Poland	12,127	12,911	14,244	13,197	14,662	18.1	16.0	16.3	18.2	16.8	218,943	206,884	231,762	240,545	246,447
Lithuania	1,749	1,355	1,240	1,161	1,113	13.9	16.9	17.1	16.1	19.7	24,283	22,942	21,188	18,717	21,946
Latvia	888	624	633	637	590	14.7	15.3	16.1	13.3	15.9	13,061	9,535	10,188	8,459	9,374
Estonia	486	[3] 394	367	357	329	16.7	[3] 15.9	18.4	15.5	17.5	8,129	[3] 6,246	6,735	5,537	5,748
Finland	589	578	567	550	556	17.8	19.6	22.7	20.0	23.6	10,490	11,316	12,892	10,999	13,129
Russia	61,055	59,442	69,086	63,594	---------	12.0	11.4	13.7	11.9	---------	735,505	675,768	944,607	755,831	---------

Total European countries reporting all years	44,868	39,710	41,311	39,949	42,204	21.7	19.4	19.3	22.5	21.2	973,223	771,168	796,714	896,934	895,340
Estimated European total, excluding Russia	45,200	39,200	42,000	41,000	43,000						[4] 978,000	781,000	813,000	901,000	902,000
Total Northern Hemisphere countries reporting all years	47,221	45,995	45,702	44,269	46,421	21.4	18.7	19.0	21.6	20.4	1,011,410	859,169	869,829	954,918	949,130
Estimated total, excluding Russia and China	48,020	45,900	47,000	45,000	47,000						[4] 1,023,000	876,000	893,000	965,000	962,000
SOUTHERN HEMISPHERE															
Chile	5	4	6	5		22.2	16.0	19.5	17.4		111	64	117	87	
Argentina	85	380	535	1,194	1,291	7.5	8.1	12.4	6.4	3.7	640	3,061	6,614	7,677	4,723
Union of South Africa	108	[2] 164	107			6.7	[2] 5.5	5.8			724	[2] 909	623		
Australia	9	4	3			12.7	12.8	15.7			114	51	47		
New Zealand	[5] 4	1	1			[5] 28.5	23.0	16.0			[5] 114	23	16		
Estimated world total, excluding Russia and China	48,300	46,500	48,000	47,000	49,000						[4] 1,025,000	881,000	903,000	975,000	969,000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures are for crops harvested during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes of boundary have occurred, averages are for estimates for territory within present boundaries.
[2] 3-year average.
[3] 4-year average.
[4] The estimate for the 5-year period, 1909–1913, given in this table is somewhat larger than the figures obtained by averaging the 5-years in Table 36. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 36 they are for pre-war territory. As a result, in excluding Russia, which country lost territory in the war, a smaller area is excluded in this table than in Table 36.
[5] 2-year average.

TABLE 36.—*Rye: World production, 1894–1929*

Year	World production excluding Russia and China	Northern Hemisphere production excluding Russia and China	European production excluding Russia	Selected countries: Russia [1]	United States	Germany	France	Poland	Hungary	Czechoslovakia
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1894	663	662	618	931	30	279	75	----------	80	----------
1895	620	618	573	773	31	260	72	----------	47	----------
1896	664	663	621	790	29	285	70	----------	37	----------
1897	599	598	551	654	33	273	48	----------	26	----------
1898	667	666	619	738	33	297	67	----------	33	----------
1899	710	708	664	912	30	342	67	----------	36	----------
1900	675	673	629	920	31	337	59	----------	31	----------
1901	690	688	644	755	31	321	58	----------	31	----------
1902	733	731	682	919	35	374	46	----------	38	----------
1903	768	767	721	912	32	391	58	----------	37	----------
1904	755	754	709	1,008	32	396	53	----------	33	----------
1905	782	781	732	737	35	378	59	----------	38	----------
1906	787	785	736	668	37	379	51	----------	39	----------
1907	751	749	700	815	35	384	56	----------	30	----------
1908	827	826	776	790	36	423	52	----------	34	----------
1909 [2]	872	870	821	904	35	447	56	----------	47	----------
1910 [2]	818	816	768	875	35	414	44	----------	52	----------
1911 [2]	828	826	779	769	33	428	47	----------	54	----------
1912 [2]	862	860	810	1,051	36	457	49	----------	57	----------
1913 [2]	892	889	834	1,011	41	481	50	----------	56	----------
1914	766	763	707	[3] 870	43	347	44	----------	45	----------
1915	691	689	621	[4] 910	54	301	33	----------	48	----------
1916	663	661	598	[5] 771	49	287	33	----------	----------	----------
1917	548	545	466	614	63	[6] 228	25	----------	----------	----------
1918	590	588	476	----------	91	250	29	----------	----------	----------
1919	681	679	581	----------	75	238	31	103	----------	----------
1920	619	616	533	368	60	194	37	74	[6] 21	33
1921	853	850	760	401	62	268	44	175	23	54
1922	864	858	716	568	103	206	38	203	25	51
1923	925	919	826	784	63	263	37	243	31	53
1924	747	743	657	737	65	226	40	148	22	45
1925	1,016	1,009	946	889	46	317	44	265	33	58
1926	821	813	753	926	41	252	30	204	31	46
1927 [7]	903	893	813	945	58	269	34	232	22	49
1928 [7]	975	965	901	756	43	335	34	241	33	70
1929 [7]	969	962	902	----------	41	321	39	246	33	64

Bureau of Agricultural Economics. For each year is shown the production during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] The average production for the 1909–1913 period as computed from figures given here for estimated world total, Northern Hemisphere total, European total and European countries whose boundaries were changed by the World War, will not agree with estimates appearing elsewhere for present territory due to changes in boundary.
[3] Exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[4] Exclusive of Russian Poland, Lithuania, parts of Latvia and the Ukraine, and the two Provinces of Batum and Elizabetpol in Transcaucasia.
[5] Beginning with this year estimates for the present territory of the Union of Socialist Soviet Republics exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924 produced 8,646,000 bushels.
[6] Beginning with this year postwar boundaries, therefore not comparable with earlier years.
[7] Preliminary.

TABLE 37.—*Rye: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	2.8	14.8	20.5	17.1	11.3	7.6	5.8	6.4	7.6	3.4	1.7	1.0	100.0
1918	5.6	11.3	14.9	14.5	12.2	9.5	8.4	4.9	6.3	4.8	3.4	4.2	100.0
1919	8.2	15.0	13.3	12.4	7.8	9.1	8.5	4.7	6.2	6.4	4.3	4.1	100.0
1920	7.3	20.7	18.1	12.2	8.8	7.0	6.6	4.7	4.3	3.7	3.3	3.3	100.0
1921	13.9	20.8	17.6	10.6	6.3	5.9	4.5	4.8	4.9	4.0	4.2	2.5	100.0
1922	10.7	20.5	14.8	12.3	10.2	8.7	6.5	5.3	4.0	2.9	2.2	1.9	100.0
1923	5.3	18.8	19.2	14.2	9.4	8.5	5.4	5.9	3.5	2.5	3.0	4.3	100.0
1924	3.9	16.9	25.4	23.3	10.7	7.0	5.0	3.1	1.7	1.0	1.2	.8	100.0
1925	5.2	19.2	23.3	12.4	8.7	8.9	6.6	4.6	3.1	2.4	2.8	2.8	100.0
1926	8.0	20.1	19.7	13.0	8.5	6.0	6.0	6.0	3.7	2.6	3.0	3.4	100.0
1927	4.7	19.0	25.6	17.5	9.8	5.8	4.4	4.1	3.7	2.4	1.7	1.3	100.0
1928	4.5	19.5	27.0	16.3	9.3	6.1	4.5	5.1	2.9	1.9	1.4	1.5	100.0

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TABLE 38.—*Rye: Classification of receipts graded by licensed inspectors, all inspection points, 1923–1928*

Year beginning July	Receipts of—						Shipments of—	
	No. 1	No. 2	No. 3	No. 4	Sample grade	Total	Sample grade	Total
1923–24: Cars	14,394	13,532	3,872	1,061	473	33,332	26	30,796
1924–25: Cars	27,977	24,251	8,841	2,957	876	64,902	69	70,946
1925–26: Cars	3,969	11,730	5,111	1,794	494	23,098	30	19,133
1926–27: Cars	3,892	9,921	5,794	3,597	1,445	24,649	123	31,285
1927–28: Cars	10,659	15,573	4,976	1,409	564	33,181	22	28,960
1928–29: Cars	1,787	13,081	6,646	1,994	626	24,134	142	15,364

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TABLE 39.—*Rye: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC RYE IN UNITED STATES[1]

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27							13,092	12,880	13,897	13,905	7,818	3,783
1927–28	1,018	1,454	2,091	2,608	2,077	2,970	3,281	4,027	4,321	5,090	5,544	2,662
1928–29	2,499	2,170	1,351	2,684	4,771	5,589	6,176	6,185	6,440	6,914	6,598	6,532
1929–30	6,632	6,614	8,561	9,771	11,453	12,033						

UNITED STATES RYE IN CANADA

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1926–27							1,658	1,704	1,583	1,384	3,379	869
1927–28	1,465	589	686	1,385	1,390	1,208	930	772	351	259	47	512
1928–29	750	449	357	838	1,248	1,478	1,707	1,426	1,255	1,310	1,367	1,379
1929–30	1,182	1,255	1,540	2,900	2,883	2,990						

CANADIAN RYE IN UNITED STATES[2]

	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
1926–27							2,266	1,922	1,631	494	689	792
1927–28	63	50	20	124	441	802	851	458	203	90	90	371
1928–29	248	255	12	83	205	258	208	532	559	440	451	480
1929–30	380	394	432	320	429	431						

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay, and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes rye in store in public and private elevators in 39 important markets and also the rye afloat in vessels or barges in harbors of lake and seaboard ports. Rye in transit either by rail or water, mill stocks or small private stocks of rye intended only for local purposes, not included.

[2] Includes rye stored at lake and seaboard ports, exclusive of rye in transit on lakes and canals.

TABLE 40.—*Rye: Receipts at specified markets, 1921–1928*

Year beginning July	Minneapolis	Duluth	Chicago	Milwaukee	Omaha	Total, 5 markets	Fort William and Port Arthur [1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921	4,754	17,444	4,235	2,282	2,048	30,763	5,297
1922	15,111	42,744	7,585	3,241	1,916	70,597	11,552
1923	13,336	16,836	2,952	1,449	736	35,309	6,837
1924	8,147	38,496	12,586	2,733	1,207	63,469	5,265
1925	7,872	10,907	2,426	876	892	22,973	5,329
1926	4,123	13,351	2,355	1,268	941	22,038	7,763
1927 [1]	5,423	25,088	4,151	673	1,564	36,899	11,963
1928 [2]	7,375	10,881	5,288	1,053	1,354	25,951	8,180

Bureau of Agricultural Economics. Compiled from reports of Minneapolis Chamber of Commerce, Duluth Board of Trade, Chicago Board of Trade, Milwaukee Chamber of Commerce, Omaha Grain Exchange, American Elevator and Grain Trade, and Canadian Grain Statistics.

[1] Crop year begins September.
[2] Figures subject to revision.

TABLE 41.—*Rye, including flour: International trade, average 1910–1914, annual 1926–1929*

Country	Year ended June 30									
	Average 1910–1914		1926		1927		1928		1929 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
United States	0	888	0	12,647	0	21,698	0	26,346	0	9,488
Russia	[1] 5,381	[1] 33,979	0	7,094	0	16,691				
Canada	65	58	23	5,768	47	8,229	114	10,379		6,430
Hungary	[1] 140	[1] 14,150	1	6,832	1	10,455	1	4,431	1	5,136
Argentina	0	[2] 273	0	1,812	0	5,902	0	7,060		
Poland			2,334	11,983	4,273	5,063	4,832	375	792	1,415
Rumania	[1, 3] 26	[1] 2,992	51	105	[1] 0	[1] 1,503	[1] 0	[1] 2,189		
Bulgaria	0	[1] 1,925	0	59	0	506	0	807		
Yugoslavia	0	0	0	[4] 231	0	[1] 506	0	[1] 13		
Algeria	0	0	0	[4] 47	0	[4] 28	[1] 0	[1] 40		
PRINCIPAL IMPORTING COUNTRIES										
Germany	16,226	43,936	9,149	15,963	22,797	7,876	24,861	10,199	7,235	22,965
Finland			6,471	7	5,296	10	4,932	10	7,757	12
Norway	[1] 10,644	[1, 5] 51	7,719	0	7,038	0	7,307	0	6,024	0
Denmark	[1] 8,753	[1] 288	8,610	425	6,550	445	7,401	417	7,216	392
Netherlands	[1] 29,557	[1] 17,889	6,046	434	4,037	840	4,148	629	3,451	531
Czechoslovakia	0	0	8,169	102	4,631	131	7,622	102	2,581	1,663
Austria	[1] 1,469	[1] 2	4,020	[6] 162	4,277	248	4,617	101		
Sweden	[1] 3,940	[1] 59	1,455	98	633	1,645	4,177	636	4,550	260
Latvia	0	0	[4] 2,648	[1] 66	[4] 2,043	[1] 20				
France	3,316	26	894	128	5,016	1	753	8	571	5
United Kingdom [7]	2,120	7	1,167	165	792	173	717	83		
Estonia	0	0	1,921	[1] 1	1,944	0	1,085	0	2,680	0
Belgium	5,755	830	1,913	84	3,484	18	753	67	376	33
Italy	654	2	493	24	538	2	107	17		
Switzerland	[1] 728	[1] 1	85	0	15	0	53	0	6	0
Total 25 countries	88,774	117,356	63,169	64,237	73,412	81,990	73,480	63,909	43,240	48,330

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] Year ended July 31, International Yearbook of Agricultural Statistics.
[2] Average of calendar years, 1909–1913.
[3] Average for the seasons 1911–12 to 1913–14.
[4] International Crop Report and Agricultural Statistics.
[5] Season 1913–14.
[6] Year ended June 30, International Yearbook of Agricultural Statistics.
[7] Year ended Dec. 31.

TABLE 42.—*Rye: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	80.1	75.4	72.6	73.2	72.7	73.3	75.4	76.3	76.6	75.8	74.8	74.7	74.6
1910	74.5	74.2	73.4	72.2	71.6	72.4	83.2	72.5	73.6	75.6	76.8	77.4	73.4
1911	76.2	76.2	78.3	81.4	83.2	83.0	83.6	84.2	84.6	84.8	85.4	84.8	81.0
1912	80.8	74.4	70.4	69.4	67.6	65.0	66.4	66.0	63.0	62.6	63.2	63.6	68.7
1913	62.0	61.8	63.9	64.0	63.3	63.0	62.1	61.8	62.4	63.0	63.6	63.8	62.9
1914	62.0	68.2	77.2	79.6	83.3	88.4	95.4	103.0	102.9	101.2	100.0	95.9	83.3
1915	91.4	87.2	83.6	83.7	84.6	84.4	86.8	87.0	84.6	83.6	83.8	83.6	85.0
1916	83.4	91.6	101.9	109.7	118.7	120.3	121.0	124.8	130.8	149.8	173.6	180.0	113.0
1917	177.6	170.0	165.8	169.3	167.4	168.2	172.6	187.9	218.0	228.1	204.4	178.8	176.4
1918	166.9	161.6	156.6	153.3	152.1	151.2	145.6	136.3	139.0	150.6	149.6	141.2	152.1
1919	144.2	144.0	137.0	132.8	131.5	142.8	153.4	149.8	150.6	169.6	183.5	186.4	146.9
1920	178.8	168.8	165.6	152.2	134.4	125.8	128.1	128.8	122.4	112.0	108.8	108.0	148.2
1921	101.0	94.0	89.2	81.6	72.2	69.6	70.0	77.0	83.8	85.9	87.8	82.8	86.9
1922	74.0	66.9	63.2	65.2	68.2	70.7	71.7	71.0	70.1	70.8	69.2	62.2	68.1
1923	56.3	55.3	57.2	58.8	62.1	63.9	63.5	64.5	62.8	60.4	60.1	61.6	59.4
1924	68.8	79.8	80.1	105.7	108.6	112.7	126.2	132.2	125.1	100.9	103.6	101.8	96.3
1925	92.3	92.8	81.9	74.1	73.4	86.8	88.2	82.5	73.4	73.8	72.5	76.0	83.1
1926	80.7	86.1	81.6	82.4	83.0	82.4	83.6	88.4	86.4	85.2	90.1	94.9	84.2
1927	91.2	80.6	81.4	81.0	84.0	87.8	88.0	89.5	96.0	99.8	111.5	106.8	84.7
1928	99.2	83.6	81.8	87.1	86.3	87.2	87.9	91.5	91.5	86.0	79.1	75.7	85.4
1929	85.3	91.8	89.2	89.9	85.5	88.4	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of rye for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923.

TABLE 43.—*Rye No. 2: Weighted average price* [1] *per bushel of reported cash sales, Minneapolis, 1909–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Weighted average [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	76	67	66	68	69	72	77	76	74	73	71	69	70
1910	73	73	71	72	74	77	79	78	84	88	101	87	77
1911	79	80	85	92	88	87	90	88	89	89	87	79	86
1912	69	64	62	63	58	56	58	57	55	57	57	56	60
1913	57	61	61	56	54	55	55	56	56	57	60	59	58
1914	58	80	89	87	101	106	115	124	112	111	116	112	98
1915	102	97	90	96	93	92	96	95	89	93	94	94	94
1916	93	115	120	126	144	138	142	142	158	180	226	237	135
1917	220	175	184	181	177	183	193	224	291	274	230	185	193
1918	184	168	160	158	162	157	154	134	154	171	155	145	158
1919	154	148	139	136	138	166	173	153	170	195	208	214	160
1920	209	192	185	166	148	149	158	144	142	128	137	126	161
1921	115	100	99	80	72	78	75	95	97	97	102	86	92
1922	76	69	66	71	81	83	82	80	76	81	72	64	75
1923	61	62	66	66	64	65	67	66	63	61	63	70	65
1924	83	86	95	121	123	133	154	154	130	106	114	111	114
1925	95	100	83	77	81	98	99	91	81	85	83	89	88
1926	102	97	93	95	94	94	99	102	99	99	109	111	98
1927	104	92	92	92	99	102	103	106	114	124	128	123	104
1928	111	94	94	94	98	97	101	105	100	89	85	84	95
1929	107	98	97	97	95	98	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record. Chicago prices, 1909–1927 appear in Table 46, 1927 Yearbook.

[1] Average of daily prices weighted by car-lot sales.

TABLE 44.—*Corn: Acreage, production, value, exports, etc., United States, 1890–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago[1]	Foreign trade, including meal, year beginning July 1[2]			
							Domestic exports	Imports	Net exports[3]	
									Total	Percentage of production
	1,000 acres	*Bushels of 56 lbs. shelled*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1890	70,390	20.7	1,460,406	50.0	729,647	58	32,042	2	32,039	2.2
1891	74,496	27.6	2,055,823	39.7	816,917	47	76,602	16	76,596	3.7
1892	72,610	23.6	1,713,688	38.8	664,390	41	47,122	2	47,120	2.7
1893	74,434	22.9	1,707,572	35.9	612,998	41	66,490	3	66,487	3.9
1894	69,396	19.3	1,339,680	45.1	604,523	44	28,585	17	28,569	2.1
1895	85,567	27.0	2,310,952	25.0	578,408	26	101,100	5	101,096	4.4
1896	86,560	28.9	2,503,484	21.3	532,884	25	178,817	7	178,811	7.1
1897	88,127	24.3	2,144,553	26.0	558,309	30	212,056	4	212,052	9.9
1898	88,304	25.6	2,261,119	28.4	642,747	34	177,255	4	177,252	7.8
1899	*94,914*	*28.1*	*2,666,324*							
1899	94,914	25.9	2,454,628	29.9	734,916	36	213,123	3	213,121	8.7
1900	95,042	26.4	2,505,148	35.1	878,243	43	181,405	5	181,400	7.2
1901	94,636	17.0	1,613,528	60.1	969,285	62	28,029	19	28,011	1.7
1902	95,517	27.4	2,619,499	40.1	1,049,791	47	76,639	41	76,598	2.9
1903	90,661	25.9	2,346,897	42.1	987,882	49	58,222	17	58,210	2.5
1904	93,340	27.1	2,528,662	43.7	1,105,690	48	90,293	16	90,278	3.6
1905	93,573	29.4	2,748,949	40.8	1,120,513	44	119,894	11	119,883	4.4
1906	93,643	30.9	2,897,662	39.3	1,138,053	50	86,368	11	86,358	3.0
1907	94,971	26.5	2,512,065	50.9	1,277,607	68	55,064	20	55,044	2.2
1908	95,603	26.6	2,544,957	60.0	1,527,679	65	37,665	258	37,437	1.5
1909	*98,383*	*25.9*	*2,552,190*							
1909	98,383	26.1	2,572,336	58.6	1,507,185	59	38,128	118	38,010	1.5
1910	104,035	27.7	2,886,260	48.0	1,384,817	53	65,615	53	65,562	2.3
1911	105,825	23.9	2,531,488	61.8	1,565,258	71	41,797	54	41,744	1.6
1912	107,083	29.2	3,124,746	48.7	1,520,454	53	50,780	903	49,913	1.6
1913	105,820	23.1	2,446,988	69.1	1,692,092	70	10,726	12,368	[4] 1,639	
1914	103,435	25.8	2,672,804	64.4	1,722,070	70	50,668	9,899	40,816	1.5
1915	106,197	28.2	2,994,793	57.5	1,722,680	79	39,897	5,211	34,761	1.2
1916	105,296	24.4	2,566,927	88.9	2,280,729	111	66,753	2,270	65,092	2.5
1917	116,730	26.3	3,065,233	127.9	3,920,228	163	49,073	3,197	45,950	1.5
1918	104,467	24.0	2,502,665	136.5	3,416,240	162	23,019	3,346	19,684	.8
1919 [5]	*87,772*	*26.7*	*2,345,833*							
1919	97,170	28.9	2,811,302	134.5	3,780,597	159	16,729	10,283	6,509	.2
1920	101,699	31.5	3,208,584	67.0	2,150,332	62	70,906	5,791	66,116	2.1
1921	103,740	29.6	3,068,569	42.3	1,297,213	55	179,490	142	179,374	5.8
1922	102,846	28.3	2,906,020	65.8	1,910,775	73	96,596	182	96,415	3.3
1923	104,324	29.3	3,053,557	72.6	2,217,229	88	23,135	240	22,896	.7
1924 [5]	*82,329*	*22.2*	*1,823,880*							
1924	100,863	22.9	2,309,414	98.2	2,266,771	106	9,791	4,618	5,348	.2
1925	101,302	28.8	2,916,106	67.4	1,966,162	75	24,783	637	24,150	.8
1926	99,615	27.0	2,691,531	64.2	1,728,970	87	19,819	1,098	18,731	.7
1927	98,393	28.1	2,763,093	72.3	1,997,759	101	19,409	5,463	14,364	.5
1928	100,673	28.0	2,818,901	75.2	2,119,046	92	41,880	490	41,393	1.5
1929 [6]	98,018	26.8	2,622,189	78.1	2,048,134					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board and relate to equivalent production of grain on entire acreage grown for all purposes; italic figures are census returns. See 1927 Yearbook, page 774, for data for earlier years.

[1] Prices 1890–1898 are averages of the weekly quotations for No. 2 or better in annual reports of Chicago Board of Trade; subsequently prices are compiled from the Chicago Daily Trade Bulletin, average of daily prices weighted by car-lot sales, No. 3 yellow.

[2] Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce. Corn—General imports 1890–909 and 1912–1929; imports for consumption 1910–11. Corn meal—Imports for consumption, 1890–1929. Corn meal converted to terms of grain on the basis that 1 barrel is the product of 4 bushels of corn.

[3] Total exports (domestic plus foreign) minus total imports.

[4] Net imports, i. e., total imports minus total exports (domestic and foreign).

[5] Corn harvested for grain; total acreage of corn in 1924 is 98,401,627 acres.

[6] Preliminary.

TABLE 45.—*Corn: Acreage and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage: Average 1923–1927	Acreage: 1926	Acreage: 1927	Acreage: 1928	Acreage: 1929 [1]	Production: Average 1923–1927	Production: 1926	Production: 1927	Production: 1928	Production: 1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	14	13	14	13	13	543	455	518	520	520
New Hampshire	17	15	15	14	14	745	645	615	560	574
Vermont	86	84	84	80	88	3, 690	3, 612	3, 276	3, 520	3, 608
Massachusetts	48	45	46	45	42	2, 114	1, 980	1, 886	1, 890	1, 638
Rhode Island	10	9	10	10	10	386	369	380	390	420
Connecticut	58	54	55	55	55	2, 482	2, 268	2, 090	2, 310	2, 365
New York	692	670	663	650	676	23, 689	23, 450	22, 542	22, 100	21, 024
New Jersey	199	188	179	181	183	8, 445	8, 648	7, 160	6, 968	6, 588
Pennsylvania	1, 386	1, 394	1, 270	1, 283	1, 309	57, 760	57, 154	50, 165	50, 037	46, 470
North Atlantic	2, 509	2, 472	2, 336	2, 331	2, 390	99, 854	98, 581	88, 632	88, 295	83, 207
Ohio	3, 608	3, 591	3, 376	3, 646	3, 518	137, 122	147, 231	109, 720	136, 725	128, 407
Indiana	4, 600	4, 672	4, 205	4, 483	4, 124	163, 952	177, 536	132, 458	157, 802	131, 968
Illinois	9, 002	9, 205	8, 469	9, 570	8, 900	320, 656	322, 175	354, 070	367, 488	311, 500
Michigan	1, 590	1, 593	1, 418	1, 461	1, 344	52, 578	54, 162	38, 995	48, 944	32, 928
Wisconsin	2, 168	2, 119	2, 100	2, 121	2, 036	76, 626	73, 106	68, 250	89, 082	81, 440
Minnesota	4, 309	4, 343	4, 172	4, 089	4, 253	140, 512	147, 662	127, 246	139, 026	148, 855
Iowa	10, 999	11, 170	10, 901	11, 202	10, 944	411, 446	435, 630	386, 986	464, 883	437, 760
Missouri	6, 374	6, 471	5, 796	6, 260	5, 384	178, 203	176, 011	168, 084	181, 540	126, 524
North Dakota	1, 037	1, 009	959	997	1, 057	24, 708	18, 162	23, 975	24, 426	16, 384
South Dakota	4, 557	4, 630	4, 655	4, 469	4, 916	108, 883	83, 340	134, 995	93, 849	112, 085
Nebraska	8, 772	8, 994	8, 805	8, 937	9, 144	226, 251	139, 407	291, 446	212, 701	237, 744
Kansas	5, 947	5, 563	5, 897	6, 634	6, 103	120, 170	61, 193	176, 910	179, 118	106, 802
North Central	62, 962	63, 360	60, 753	63, 869	61, 723	1, 961, 107	1, 835, 615	1, 913, 135	2, 095, 584	1, 872, 397
Delaware	146	138	135	136	132	4, 760	4, 278	4, 725	4, 488	4, 224
Maryland	558	554	515	530	525	22, 241	22, 049	22, 660	19, 345	19, 162
Virginia	1, 683	1, 694	1, 626	1, 626	1, 522	43, 704	46, 585	47, 967	44, 715	44, 138
West Virginia	504	485	441	459	441	16, 533	16, 005	14, 774	16, 524	13, 892
North Carolina	2, 410	2, 376	2, 352	2, 305	2, 259	50, 114	52, 272	53, 626	42, 642	48, 568
South Carolina	1, 627	1, 426	1, 497	1, 422	1, 422	23, 901	22, 103	25, 449	17, 064	23, 321
Georgia	3, 923	3, 817	3, 893	3, 620	3, 656	49, 290	55, 346	54, 502	38, 010	50, 453
Florida	625	551	573	607	625	8, 443	7, 714	7, 449	7, 891	8, 438
South Atlantic	11, 476	11, 041	11, 032	10, 705	10, 582	218, 986	226, 352	231, 152	190, 679	212, 196
Kentucky	3, 107	3, 069	2, 885	3, 029	2, 938	86, 432	101, 277	75, 010	66, 638	80, 795
Tennessee	3, 065	3, 099	2, 944	2, 915	2, 944	71, 942	85, 222	70, 656	56, 842	73, 600
Alabama	2, 894	2, 825	2, 800	2, 650	2, 676	41, 735	45, 765	44, 800	30, 475	37, 464
Mississippi	2, 076	1, 918	1, 918	1, 765	1, 765	33, 435	36, 826	34, 140	24, 710	35, 300
Arkansas	2, 009	2, 026	1, 925	2, 002	1, 882	34, 126	41, 533	36, 575	34, 034	26, 348
Louisiana	1, 273	1, 127	1, 161	1, 242	1, 180	20, 233	19, 722	20, 318	21, 114	21, 476
Oklahoma	2, 843	2, 353	3, 177	3, 050	3, 020	51, 293	61, 178	84, 190	70, 150	48, 320
Texas	4, 187	3, 844	5, 189	4, 722	4, 533	81, 386	106, 863	119, 347	99, 162	86, 127
South Central	21, 454	20, 261	21, 999	21, 375	20, 938	420, 583	498, 386	485, 036	403, 125	409, 430
Montana	370	359	305	274	301	6, 950	3, 949	7, 168	5, 206	3, 612
Idaho	72	66	76	53	54	2, 822	2, 706	3, 116	2, 438	1, 944
Wyoming	175	176	176	167	177	3, 529	3, 520	3, 520	2, 672	2, 832
Colorado	1, 409	1, 398	1, 284	1, 438	1, 366	20, 593	9, 786	19, 902	18, 694	23, 222
New Mexico	201	221	166	199	209	3, 529	4, 420	2, 490	3, 482	4, 180
Arizona	37	40	44	39	41	1, 043	1, 120	1, 408	1, 014	1, 148
Utah	20	18	19	18	19	490	432	513	522	589
Nevada	2	2	2	2	2	43	48	50	44	56
Washington	53	49	43	46	48	1, 873	1, 715	1, 591	1, 794	1, 824
Oregon	71	75	81	82	86	2, 347	2, 475	2, 916	2, 952	3, 010
California	89	77	77	75	82	2, 992	2, 426	2, 464	2, 400	2, 542
Far Western	2, 499	2, 481	2, 273	2, 393	2, 385	46, 210	32, 597	45, 138	41, 218	44, 959
United States	100, 899	99, 615	98, 393	100, 673	98, 018	2, 746, 740	2, 691, 531	2, 763, 093	2, 818, 901	2, 622, 189

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[1] Preliminary.

TABLE 46.—*Corn: Utilization for grain, silage, hogging down, grazing, and forage, by States, 1928 and 1929*

State and division	1928					1929				
	For grain		For silage		Hogging down, grazing, and forage acreage	For grain		For silage		Hogging down, grazing, and forage acreage
	Acreage	Production	Acreage	Production		Acreage	Production	Acreage	Production	
	1,000 acres	*1,000 bushels*	*1,000 acres*	*1,000 tons*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 acres*	*1,000 tons*	*1,000 acres*
Maine	1	40	9	94	3	1	40	9	90	3
New Hampshire	3	120	9	104	2	3	123	9	108	2
Vermont	8	352	60	690	12	10	410	64	640	14
Massachusetts	11	462	27	310	7	10	390	25	275	7
Rhode Island	3	117	5	55	2	3	126	5	55	2
Connecticut	21	882	30	315	4	21	903	30	345	4
New York	165	5,610	348	3,062	137	170	5,287	355	3,018	151
New Jersey	143	5,506	29	261	9	143	5,148	30	255	10
Pennsylvania	982	38,298	184	1,380	117	1,001	35,536	203	1,441	105
North Atlantic	1,337	51,387	701	6,271	293	1,362	47,963	730	6,227	298
Ohio	3,135	117,562	227	1,771	284	2,956	109,372	253	1,771	309
Indiana	3,729	134,244	175	1,312	579	3,410	110,825	172	1,204	542
Illinois	8,527	330,848	326	2,282	717	7,906	280,663	349	2,443	645
Michigan	794	27,790	365	2,592	302	635	16,510	383	1,915	326
Wisconsin	888	38,184	978	7,628	255	870	36,105	949	7,118	217
Minnesota	2,391	83,685	438	3,022	1,260	2,598	93,528	420	2,814	1,235
Iowa	9,725	403,588	253	2,075	1,224	9,504	380,160	240	1,872	1,209
Missouri	5,838	169,302	67	436	355	4,936	115,996	58	348	390
North Dakota	218	5,559	69	242	710	236	3,894	83	183	738
South Dakota	2,879	61,898	72	346	1,518	3,248	75,678	74	333	1,594
Nebraska	7,559	179,904	43	202	1,335	7,792	202,592	44	233	1,308
Kansas	6,141	165,807	104	582	389	5,444	95,270	114	570	545
North Central	51,824	1,718,371	3,117	22,490	8,928	49,535	1,520,593	3,139	20,804	9,049
Delaware	132	4,356	3	24	1	128	4,096	3	22	1
Maryland	487	17,776	27	189	16	482	17,593	27	162	16
Virginia	1,531	42,102	61	488	34	1,424	41,296	64	512	34
West Virginia	422	15,192	24	158	13	409	12,884	20	130	12
North Carolina	2,207	40,830	14	70	84	2,161	46,462	14	91	84
South Carolina	1,365	16,380	7	28	50	1,365	22,386	7	24	50
Georgia	3,534	37,107	9	32	77	3,571	49,280	10	30	75
Florida	594	7,722	2	11	11	612	8,262	2	11	11
South Atlantic	10,272	181,465	147	1,000	286	10,152	202,259	147	982	283
Kentucky	2,820	62,040	44	308	165	2,747	75,542	46	322	145
Tennessee	2,760	53,820	30	150	125	2,788	69,700	30	180	126
Alabama	2,560	29,440	5	16	85	2,590	36,260	5	18	81
Mississippi	1,627	22,778	14	66	124	1,639	32,780	14	70	112
Arkansas	1,912	32,504	5	25	85	1,796	25,144	6	21	80
Louisiana	1,191	20,247	10	50	41	1,130	20,566	11	50	39
Oklahoma	2,986	68,678	10	55	54	2,954	47,264	12	55	54
Texas	4,626	97,146	9	36	87	4,413	83,847	11	42	109
South Central	20,482	386,653	127	706	766	20,057	391,103	135	758	746
Montana	84	1,596	9	34	181	76	912	8	20	217
Idaho	32	1,472	9	81	12	33	1,221	9	86	12
Wyoming	107	1,926	4	18	56	116	1,972	4	20	57
Colorado	1,007	13,594	57	342	374	936	16,380	50	325	380
New Mexico	165	2,970	7	28	27	183	3,660	7	35	19
Arizona	26	676	4	28	9	29	812	4	28	8
Utah	9	270	4	34	5	9	288	5	43	5
Nevada	1	23	1	7	0	1	28	1	8	0
Washington	20	780	16	144	10	20	760	17	162	11
Oregon	45	1,665	28	196	9	48	1,776	28	190	10
California	37	1,221	20	200	18	44	1,408	20	220	18
Far western	1,533	26,193	159	1,112	701	1,495	29,217	153	1,137	737
United States	85,448	2,364,069	4,251	31,579	10,974	82,601	2,191,135	4,304	29,908	11,113

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TABLE 47.—*Corn: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State and division	Yield per acre							Estimated price per bushel						
	Average, 1918-1927	1924	1925	1926	1927	1928	1929	Average, 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	43.4	43.0	45.0	35.0	37.0	40.0	40.0	114	136	112	100	110	115	120
New Hampshire	45.6	48.0	50.0	43.0	41.0	40.0	41.0	110	134	100	100	105	120	110
Vermont	44.4	47.0	48.0	43.0	39.0	44.0	41.0	106	118	100	95	105	110	105
Massachusetts	45.5	45.0	50.0	44.0	41.0	42.0	39.0	118	129	110	115	120	130	135
Rhode Island	41.7	40.0	45.0	41.0	38.0	39.0	42.0	122	140	120	115	120	135	140
Connecticut	45.1	43.0	50.0	42.0	38.0	42.0	43.0	114	120	110	115	120	130	110
New York	37.2	34.0	36.0	35.0	34.0	34.0	31.1	99	117	97	86	96	99	103
New Jersey	42.6	34.0	52.0	46.0	40.0	38.5	36.0	90	116	73	80	85	97	101
Pennsylvania	43.2	36.5	51.0	41.0	39.5	39.0	35.5	92	118	80	78	91	93	100
North Atlantic	41.6	36.3	46.8	39.9	37.9	37.9	34.8	95.1	118.2	85.3	82.7	93.9	97.7	102.4
Ohio	39.1	26.0	48.0	41.0	32.5	37.5	36.5	74	104	57	60	77	76	78
Indiana	36.1	25.6	43.5	38.0	31.5	35.2	32.0	66	94	55	50	68	69	74
Illinois	35.3	33.0	42.0	35.0	30.0	38.4	35.0	69	95	58	56	71	70	72
Michigan	34.5	28.5	40.0	34.0	27.5	33.5	24.5	83	106	75	73	85	84	89
Wisconsin	39.6	26.0	46.5	34.5	32.5	42.0	40.0	83	105	72	75	84	78	83
Minnesota	35.5	27.0	36.0	34.0	30.5	34.0	35.0	64	85	56	56	64	62	65
Iowa	39.8	28.0	43.9	39.0	35.5	41.5	40.0	67	93	56	56	69	67	70
Missouri	27.7	24.0	29.5	27.2	29.0	29.0	23.5	76	96	69	68	75	73	86
North Dakota	25.3	21.5	23.5	18.0	25.0	24.5	15.5	63	76	55	68	62	61	68
South Dakota	27.3	21.3	17.5	18.0	29.0	21.0	22.8	61	80	60	58	57	62	62
Nebraska	26.0	22.0	26.0	15.5	33.1	23.8	26.0	67	91	61	68	62	71	69
Kansas	19.1	21.7	16.6	11.0	30.0	27.0	17.5	70	87	66	70	61	65	74
North Central	32.3	25.8	34.4	29.0	31.5	32.8	30.3	68.8	92.7	59.9	59.7	68.0	69.3	72.4
Delaware	32.8	27.0	37.0	31.0	35.0	33.0	32.0	80	112	65	64	80	88	88
Maryland	39.3	31.0	45.6	39.8	44.0	36.5	36.5	81	111	70	64	80	88	88
Virginia	26.8	21.0	22.0	27.5	29.5	27.5	29.0	100	126	101	85	92	100	100
West Virginia	33.0	26.0	36.5	33.0	33.5	36.0	31.5	103	124	100	94	100	103	106
North Carolina	20.6	18.0	18.5	22.0	22.8	18.5	21.5	103	124	110	88	91	103	100
South Carolina	15.6	12.0	12.3	15.5	17.0	12.0	16.4	104	123	110	90	90	106	99
Georgia	13.4	11.5	10.7	14.5	14.0	10.5	13.8	95	112	100	76	81	105	88
Florida	14.0	13.5	15.0	14.0	13.0	13.0	13.5	100	112	100	92	97	100	85
South Atlantic	19.6	16.0	17.6	20.5	21.0	17.8	20.1	97.5	119.2	98.8	82.4	88.2	101.0	95.5
Kentucky	27.3	25.0	26.5	33.0	26.0	22.0	27.5	84	102	81	65	88	96	91
Tennessee	24.0	21.5	20.0	27.5	24.0	19.5	25.0	88	108	89	66	83	100	92
Alabama	14.6	12.5	13.5	16.2	16.0	11.5	14.0	100	122	100	76	92	110	98
Mississippi	16.5	12.0	18.0	19.2	17.8	14.0	20.0	100	126	94	82	93	102	93
Arkansas	18.1	16.0	14.0	20.5	19.0	17.0	14.0	94	107	97	80	87	91	98
Louisiana	16.9	11.5	18.0	17.5	17.5	17.0	18.2	99	115	94	90	90	94	90
Oklahoma	19.3	19.0	7.5	26.0	26.5	23.0	16.0	76	89	90	56	59	68	79
Texas	20.5	16.0	8.5	27.8	23.0	21.0	19.0	89	110	110	60	65	78	85
South Central	20.1	17.3	15.9	24.6	22.0	18.9	19.6	88.0	107.2	91.5	67.5	77.3	88.2	89.7
Montana	17.6	18.0	16.5	11.0	23.5	19.0	12.0	85	99	95	92	72	82	84
Idaho	37.7	30.7	41.0	41.0	41.0	46.0	36.0	87	113	75	90	82	92	94
Wyoming	21.3	12.0	23.0	20.0	20.0	16.0	16.0	76	94	70	72	74	75	85
Colorado	15.6	10.0	15.0	7.0	15.5	13.0	17.0	72	88	70	71	68	68	75
New Mexico	19.1	18.0	18.0	20.0	15.0	17.5	20.0	97	110	100	87	93	89	89
Arizona	27.6	22.0	26.0	28.0	32.0	26.0	28.0	122	125	130	120	115	125	130
Utah	23.8	20.0	24.0	24.0	27.0	29.0	31.0	113	145	100	115	110	110	100
Nevada	26.1	22.4	25.0	24.0	25.0	22.0	28.0	120	121	120	120	115	112	120
Washington	36.5	30.0	35.0	35.0	37.0	39.0	38.0	97	112	95	95	90	99	103
Oregon	31.5	30.5	29.0	33.0	36.0	36.0	35.0	103	121	107	100	95	100	98
California	33.8	33.5	35.1	31.5	32.0	32.0	31.0	116	138	118	106	108	105	112
Far Western	19.5	14.4	18.6	13.1	19.9	17.2	18.9	84.4	101.6	83.1	85.8	78.1	81.2	85.0
United States	27.8	22.9	28.8	27.0	28.1	28.0	26.8	74.9	98.2	67.4	64.2	72.3	75.2	78.1

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TABLE 48.—*Corn: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual, 1927–1929*

Country	Acreage					Yield per acre					Production				
	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	309	293	132	139	152	56.0	44.3	32.3	37.7	34.1	17,297	12,974	4,262	5,241	5,183
United States	104,229	102,826	98,393	100,673	98,018	26.0	27.8	28.1	28.0	26.8	2,712,364	2,850,904	2,763,093	2,818,901	2,622,189
Mexico	[2] 6,093	7,575	7,985	7,690	---------	[2] 13.5	11.3	10.2	11.1	---------	133,362	85,241	81,839	85,540	60,777
Guatemala	(500)	390	289	298	343	---------	11.8	15.0	14.1	14.7	[3] 6,245	4,614	4,322	4,195	5,059
Total North American countries reporting area and production, all years	105,038	103,509	98,814	101,110	98,513	26.0	27.7	28.0	28.0	26.7	2,735,906	2,868,492	2,771,677	2,828,337	2,632,431
Estimated North American total	111,700	111,900	107,600	109,500	107,200	---------	---------	---------	---------	---------	2,877,000	2,965,000	2,865,000	2,925,000	2,705,000
EUROPE															
France	1,160	830	861	849	851	19.4	17.8	24.1	14.3	23.1	22,467	14,754	20,721	12,115	19,646
Spain	1,134	1,167	1,143	960	1,174	23.4	22.2	22.3	20.9	21.5	26,548	25,933	26,104	21,374	25,190
Italy	4,090	3,802	3,540	3,711	3,756	25.1	24.9	24.7	17.5	26.5	102,676	94,800	87,377	64,990	99,364
Austria	190	140	147	143	140	23.8	26.7	33.7	29.7	29.6	4,530	3,739	4,948	4,248	4,149
Czechoslovakia	376	390	344	356	335	22.3	26.8	29.7	24.6	29.2	8,398	10,444	10,233	8,763	9,797
Hungary	2,192	2,437	2,625	2,623	2,713	27.7	23.9	26.0	18.9	28.2	60,813	58,353	68,347	49,592	76,609
Yugoslavia	4,786	4,759	5,106	5,018	5,915	23.4	23.0	16.3	14.3	27.2	111,897	109,399	83,007	71,614	160,742
Bulgaria	1,492	1,458	1,682	1,595	1,928	17.6	14.4	12.5	12.7	20.9	26,277	21,021	20,954	20,272	40,383
Rumania	[4] 9,644	8,799	10,426	11,010	11,849	[4] 20.0	16.0	13.3	9.9	20.3	[4] 193,209	140,515	139,092	108,512	240,148
Poland	164	197	217	224	8,896	17.2	14.9	16.2	14.9	---------	2,822	2,926	3,519	3,348	---------
Russia, European and Asiatic	3,246	5,206	6,611	10,928	---------	16.1	17.4	20.2	12.2	---------	52,185	90,626	133,786	133,022	---------
Total European countries reporting area and production, all years	25,064	23,782	25,874	26,265	28,661	22.2	20.1	17.8	13.8	23.6	556,815	478,958	460,783	361,480	676,028
Estimated European total, excluding Russia	26,400	25,200	27,300	27,800	30,200	---------	---------	---------	---------	---------	[5] 581,000	500,000	485,000	381,000	697,000
AFRICA															
Morocco	(438)	437	527	599	575	---------	8.3	9.1	11.5	7.7	(3,500)	3,629	4,788	6,864	4,441
Egypt	[6] 1,705	1,988	2,214	2,131	---------	[6] 37.7	34.8	37.0	---------	---------	[6] 64,273	69,096	81,914	---------	---------
Estimated African total	2,600	3,100	3,600	3,300	3,800	---------	---------	---------	---------	---------	75,000	84,000	104,000	98,000	104,000

ASIA															
India	6,372	5,937	5,555	5,943	------	[3] 13.9	13.9	13.8	15.2	------	[3] 82,620	82,482	76,760	90,160	------
Japan	133	141	126	------	------	25.5	25.9	26.3	------	------	3,391	3,655	3,314	------	------
Chosen	156	231	251	255	------	14.3	12.2	11.4	12.5	------	2,236	2,819	2,854	3,190	------
Kwantung	99	162	191	203	------	17.5	17.1	18.3	21.4	------	1,737	2,771	3,497	4,353	------
Philippines	[4] 812	1,338	1,387	1,284	------	[4] 9.2	12.5	13.8	13.1	------	[4] 7,461	16,755	19,145	16,765	------
Estimated Asiatic total	9,800	10,500	10,000	10,200	10,400	------	------	------	------	------	160,000	187,000	225,000	218,000	213,000
Total Northern Hemisphere countries reporting area and production, all years	130,540	127,728	125,215	127,974	127,749	25.3	26.2	25.9	25.0	25.9	3,296,221	3,351,079	3,237,248	3,196,681	3,312,900
Estimated Northern Hemisphere total, excluding Russia	150,500	150,700	148,500	150,800	151,600	------	------	------	------	------	[5] 3,693,000	3,736,000	3,679,000	3,622,000	3,719,000
SOUTHERN HEMISPHERE															
Brazil	(6,000)	6,980	5,447	------	------	------	25.4	23.9	------	------	(140,000)	177,338	130,178	------	------
Chile	56	63	62	------	------	26.0	23.3	29.3	------	------	1,455	1,466	1,817	------	------
Uruguay	589	470	572	525	------	10.4	10.5	15.5	5.6	------	6,120	4,919	8,853	2,966	------
Argentina	8,710	8,688	10,739	11,831	------	22.0	26.2	28.5	19.6	------	191,698	227,393	305,691	231,702	------
Union of South Africa	(2,300)	4,456	4,736	5,516	------	------	12.8	11.5	12.0	------	[4] 33,517	56,890	68,523	65,946	------
Southern Rhodesia	161	223	295	338	------	11.1	18.6	15.7	19.0	------	1,834	4,140	4,630	6,429	------
Java and Madura	(3,000)	3,982	4,779	4,603	------	------	15.2	16.5	16.6	------	(42,000)	60,616	78,618	76,496	------
Australia	353	326	401	------	------	28.5	26.5	28.4	------	------	10,057	8,641	11,394	------	------
Total Southern Hemisphere countries reporting area and production all years through 1928	14,760	17,819	21,121	22,813	------	18.6	19.9	22.1	16.8	------	275,169	353,958	466,315	383,539	------
Estimated Southern Hemisphere total	21,900	26,600	29,900	33,800	------	------	------	------	------	------	445,000	572,000	660,000	591,000	------
Total Northern and Southern Hemisphere countries reporting area and production all years through 1928	158,996	160,987	161,922	166,386	------	23.9	24.2	24.0	22.7	------	3,801,628	3,898,031	3,891,177	3,783,576	------
Estimated world total, excluding Russia	172,400	177,300	178,400	184,600	------	------	------	------	------	------	[5] 4,138,000	4,308,000	4,339,000	4,213,000	------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures refer to the crop harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes in boundary have occurred, the averages reported are estimates for the crop within present boundaries.
[2] 1 year only.
[3] 2-year average.
[4] 4-year average.
[5] The estimate for the 5-year period, 1909–1913, given in this table is somewhat larger than the figure obtained by averaging the same 5-year period in Table 49. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 49 they are for pre-war territory. As a result in excluding Russia, which lost territory in the war, a smaller area is excluded in this table than in Table 49.
[6] Includes some sorghum.

TABLE 49.—*Corn: World production, 1900–1929*

Year	Estimated world production, excluding Russia	Estimated European production, excluding Russia	Selected countries						
			United States	Italy	Rumania	Argentina	Brazil	Yugoslavia	Russia [1]
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1900	3,582	440	2,505	88	85	99	----------	18	34
1901	2,745	497	1,614	100	117	84	----------	19	68
1902	3,683	392	2,616	71	68	149	----------	18	49
1903	3,551	459	2,347	89	80	175	----------	19	51
1904	3,502	279	2,529	91	20	141	----------	9	26
1905	3,902	404	2,749	97	59	195	----------	21	34
1906	4,088	533	2,898	93	131	72	----------	28	92
1907	3,768	441	2,512	88	58	136	----------	18	64
1908	3,830	465	2,545	96	79	177	----------	21	82
1909	3,858	499	2,572	99	70	175	----------	34	55
1910	4,060	564	2,886	102	104	28	----------	20	102
1911	3,908	501	2,531	94	111	296	----------	27	95
1912	4,451	547	3,125	99	104	197	----------	----------	94
1913	3,890	576	2,447	108	115	263	----------	----------	84
1914	4,186	559	2,673	105	103	325	----------	----------	[2] 90
1915	4,352	520	2,995	122	86	161	----------	----------	[3] 72
1916	3,770	389	2,567	82	----------	59	204	----------	[4] 62
1917	4,178	351	3,065	83	----------	171	95	----------	----------
1918	3,579	299	2,503	77	31	224	87	----------	----------
1919	4,242	454	2,811	86	[5] 141	259	197	----------	----------
1920	4,689	520	3,209	89	182	230	186	[5] 101	46
1921	4,315	394	3,069	92	111	176	181	74	46
1922	4,240	424	2,906	77	120	176	202	90	81
1923	4,520	469	3,054	89	153	277	180	85	67
1924	3,858	589	2,309	106	155	186	162	149	91
1925	4,586	626	2,917	110	164	322	162	149	168
1926	4,476	654	2,692	118	230	321	139	134	129
1927	4,339	485	2,763	87	139	306	130	83	131
1928	4,213	381	2,819	65	109	232	----------	72	133
1929 [6]	----------	697	2,622	99	240	----------	----------	161	----------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. For each year is shown the production during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and the Provinces of Batum and Elizabetpol in Transcaucasia.
[4] Beginning this year estimates within present boundaries of the Union of Socialist Soviet Republics, exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924 produced 28,048,000 bushels.
[5] Production in present boundaries beginning this year, therefore not comparable with earlier years.
[6] Preliminary.

TABLE 50.—*Corn: Monthly marketings, by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	5.3	4.0	3.4	3.8	8.8	12.2	14.2	16.1	13.7	7.1	5.6	5.8	100.0
1918	6.7	6.9	8.4	6.7	7.3	12.0	15.0	7.2	7.5	8.2	8.0	6.1	100.0
1919	4.5	5.6	4.9	5.6	9.2	15.0	12.9	9.5	8.7	5.9	7.6	10.6	100.0
1920	5.4	5.6	6.9	5.3	7.1	11.3	14.3	11.7	8.9	5.6	8.5	9.4	100.0
1921	4.9	7.3	8.6	6.7	6.6	12.4	13.8	12.4	7.5	4.7	7.6	7.5	100.0
1922	6.8	7.5	9.1	8.2	8.7	13.6	10.7	11.0	6.6	5.3	6.1	6.4	100.0
1923	6.8	7.2	6.1	5.6	10.4	12.3	12.9	13.3	7.4	6.1	5.9	6.0	100.0
1924	6.6	6.2	6.5	7.0	11.1	13.0	13.6	9.5	8.1	6.3	7.8	4.3	100.0
1925	5.1	7.6	5.9	5.9	9.3	14.6	12.1	10.4	8.5	5.3	7.1	8.2	100.0
1926	5.7	6.2	6.6	10.1	9.1	12.9	11.7	10.8	6.9	4.8	6.1	9.1	100.0
1927	5.1	6.5	6.3	6.2	8.6	15.5	13.8	11.7	8.9	5.4	6.6	5.4	100.0
1928	5.8	5.8	5.4	6.6	12.5	16.7	12.9	11.5	7.4	3.8	4.3	7.3	100.0

Bureau of Agricultural Economics.

TABLE 51.—*Corn: Farm stocks, growing conditions, and shipments, United States, 1909–1929*

Year beginning November	Stocks of old corn on farms Nov. 1[1]	Condition of new crop				Proportion merchantable[1]	Stocks of corn on farms on Mar. 1 following[1]	Shipped out of county where grown[1]
		July 1	Aug. 1	Sept. 1	Oct. 1			
	1,000 bush.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*1,000 bush.*	*1,000 bush.*
1909	77, 403	89. 3	84. 4	74. 6	73. 8	82. 7	980, 848	620, 057
1910	113, 919	85. 4	79. 3	78. 2	80. 3	86. 4	1, 165, 378	661, 777
1911	123, 824	80. 1	69. 6	70. 3	70. 4	80. 1	884, 059	517, 766
1912	64, 764	81. 5	80. 0	82. 1	82. 2	85. 0	1, 290, 642	680, 831
1913	137, 972	86. 9	75. 8	65. 1	65. 3	80. 1	866, 352	422, 059
1914	80, 046	85. 8	74. 8	71. 7	72. 9	84. 5	910, 894	498, 285
1915	96, 009	81. 2	79. 5	78. 8	79. 7	71. 1	1, 116, 559	560, 824
1916	87, 908	82. 0	75. 3	71. 3	71. 5	83. 9	782, 303	450, 589
1917	34, 448	81. 1	78. 8	76. 7	75. 9	60. 0	1, 253, 290	678, 027
1918	114, 678	87. 1	78. 5	67. 4	68. 6	82. 4	855, 269	362, 589
1919	69, 835	86. 7	81. 7	80. 0	81. 3	87. 1	1, 045, 575	470, 328
1920	139, 083	84. 6	86. 7	86. 4	89. 1	86. 9	1, 564, 832	705, 481
1921	285, 769	91. 1	84. 3	85. 1	84. 8	87. 5	1, 305, 559	687, 893
1922	177, 287	85. 1	85. 6	78. 6	78. 4	88. 3	1, 093, 306	518, 779
1923	83, 856	84. 9	84. 0	83. 3	82. 0	80. 8	1, 153, 847	600, 745
1924	102, 429	72. 0	70. 7	66. 4	65. 3	66. 0	757, 890	417, 730
1925	58, 248	86. 4	79. 8	75. 5	76. 2	78. 8	1, 329, 281	578, 380
1926	182, 991	77. 9	72. 5	73. 8	72. 4	71. 1	1, 134, 191	446, 951
1927	113, 399	69. 9	71. 2	69. 7	73. 6	73. 1	1, 011, 908	501, 748
1928	53, 753	78. 1	83. 3	78. 4	77. 7	80. 2	1, 021, 873	538, 540
1929[2]	76, 359	77. 6	78. 8	67. 9	71. 0			

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on reported percentages of entire crop on farms, proportion merchantable, and per cent shipped out of county where grown.
[2] Preliminary.

TABLE 52.—*Corn: Receipts at primary markets, 1921–1928*

Year beginning November	Chicago	St. Louis	Kansas City	Peoria	Omaha	Indianapolis	Total 10 markets[1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921	187, 884	34, 055	16, 031	24, 960	31, 115	21, 291	375, 409
1922	116, 711	30, 263	15, 595	21, 284	23, 308	18, 839	253, 590
1923	101, 200	39, 289	21, 105	17, 744	27, 679	17, 728	274, 128
1924	80, 700	23, 185	21, 470	21, 234	13, 345	17, 613	202, 504
1925	92, 283	27, 952	18, 643	26, 678	20, 076	18, 363	226, 192
1926	91, 880	21, 039	14, 767	23, 292	20, 482	19, 977	217, 881
1927	105, 134	34, 943	47, 603	23, 434	31, 019	22, 712	290, 492
1928 (preliminary)	95, 099	38, 517	33, 634	27, 390	16, 276	25, 519	267, 707

Bureau of Agricultural Economics. Compiled from reports of Chicago Board of Trade, Duluth Board of Trade, Indianapolis Board of Trade, Kansas City Board of Trade, Omaha Grain Exchange, St. Louis Merchants Exchange, Milwaukee Chamber of Commerce, Minneapolis Chamber of Commerce, and American Elevator and Grain Trade.

[1] Includes also Milwaukee, Minneapolis, Duluth, and Toledo.

TABLE 53.—*Shelled corn: Classification of receipts graded by licensed inspectors, all inspection points, 1917–1928*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE

Year and class	Receipts of—							
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	Sample grade	Total
Year beginning Nov.—	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1917	2, 281	18, 714	58, 562	56, 240	45, 610	44, 621	98, 844	324, 872
1918	12, 661	34, 727	40, 872	41, 491	28, 832	16, 061	19, 638	194, 262
1919	28, 517	47, 961	38, 774	56, 647	27, 313	9, 188	13, 058	221, 458
1920	68, 550	88, 875	64, 237	63, 081	21, 176	9, 420	8, 738	324, 077
1921	30, 970	197, 254	115, 207	42, 880	21, 963	15, 979	4, 951	429, 204
1922	21, 580	141, 563	98, 932	24, 262	4, 270	3, 526	3, 711	297, 844
1923	3, 038	59, 592	111, 932	69, 365	35, 905	15, 410	10, 742	305, 984
1924	7, 883	80, 883	56, 542	34, 431	31, 370	17, 252	12, 345	240, 706
1925	3, 358	59, 985	62, 757	51, 092	48, 348	40, 116	31, 473	297, 129
1926	1, 616	34, 390	57, 931	48, 217	50, 195	46, 180	31, 171	269, 700
1927	9, 682	87, 801	78, 352	47, 890	34, 638	27, 553	29, 006	314, 922
1928	25, 809	92, 285	73, 331	93, 367	40, 594	10, 400	7, 247	343, 033

Bureau of Agricultural Economics.

TABLE 54.—*Corn, including meal in terms of grain: International trade, average 1910–1914, annual 1926–1929*

Country	Year ended June 30—									
	Average, 1910–1914		1926		1927		1928		1929, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Argentina	[1] 2	[1] 115,749	-------	142,956	-------	272,454	-------	279,455	-------	[3] 243,181
United States	[4] 4,441	41,409	635	24,783	1,098	19,819	5,463	19,410	490	41,860
Rumania	[1, 4] 364	[1, 4] 46,998	21	21,239	0	[5] 59,037	0	-------	-------	-------
Yugoslavia	0	0	-------	[5] 41,122	-------	14,496	-------	671	-------	534
Union of South Africa	[1] 143	[1] 3,952	-------	38,332	-------	1,430	-------	17,620	-------	-------
Russia	[6] 299	[6] 28,354	0	7,867	0	8,170	-------	-------	-------	-------
Bulgaria	[1] 44	[6] 9,234	0	3,799	0	5,365	0	2,366	-------	-------
Hungary	0	0	46	8,752	330	2,524	688	2,028	1,124	802
Dutch East Indies [2]	0	[11] 1,215	7	3,310	10	2,684	13	3,054	[7] 10	[7] 6,434
Indo-China	0	0	0	2,335	0	2,691	0	2,979	-------	-------
British India	0	[1, 8] 580	0	38	0	2	0	1,058	0	29
China [2]	[9] 38	[9] 148	0	758	0	983	0	490	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	80,441	[1] 115	70,914	2,593	71,196	2,794	75,705	2,552	72,332	2,308
Netherlands	[6] 30,377	[6] 8,641	38,965	443	47,149	736	53,234	729	41,471	717
Germany	32,056	2	19,679	103	57,910	4	72,050	4	32,915	5
France	19,793	88	21,326	108	29,123	94	25,594	32	30,764	21
Belgium	25,818	8,238	22,588	655	26,873	1,501	27,317	1,121	22,610	1,096
Denmark	[6] 11,777	0	16,198	0	22,727	0	29,727	0	14,794	0
Irish Free State	0	0	14,127	92	15,679	172	16,847	152	17,536	142
Spain	2,023	49	18,547	1	11,540	1	-------	-------	-------	-------
Italy	14,829	265	14,232	119	16,134	23	21,135	24	-------	-------
Canada	10,678	27	9,325	62	14,924	56	15,151	41	-------	-------
Czechoslovakia	0	0	13,824	12	13,073	2	13,930	7	10,579	1
Austria	[6, 10] 15,455	[6, 10] 263	6,387	19	7,946	18	6,136	13	-------	-------
Switzerland	[6] 3,984	[6] 1	5,539	0	4,832	0	5,459	0	5,370	0
Norway	[6, 11] 1,292	0	4,497	0	5,048	0	5,176	0	3,642	0
Sweden	[6] 1,656	[6] 26	3,771	0	4,652	0	7,752	0	5,533	0
Cuba	2,860	0	3,103	0	2,935	0	2,068	0	-------	-------
Australia	[1] 440	[1] 10	1,573	34	1,193	2	-------	-------	-------	-------
Mexico [2]	4,459	101	2,615	8	4,303	2	1,119	-------	393	-------
Poland	0	0	1,792	65	4,235	21	3,018	8	1,144	15
Greece	0	0	628	-------	1,270	-------	1,005	-------	1,145	-------
Egypt	[6] 504	[6] 63	944	0	294	235	30	5,855	31	2,761
Japan	0	0	[5] 558	[5] 0	1,515	0	1,172	0	1,587	0
Tunis	[6] 442	[6] 8	291	23	684	35	1,145	-------	-------	-------
Algeria	[1] 231	[1] 1	65	10	600	12	240	25	-------	-------
Finland	[1] 260	0	44	0	148	0	206	0	293	0
Uruguay [2]	5	201	132	43	878	4	615	2	-------	2,364
Latvia [5]	0	0	20	0	8	0	-------	-------	-------	-------
Estonia	0	0	[5] 16	[5] 0	0	0	23	0	292	0
Total 40 countries	264,711	265,738	292,409	299,681	368,307	395,367	392,018	339,696	264,055	302,270

Bureau of Agricultural Economics. Official sources except where otherwise noted. Maicena or Maizena is included with "Corn and corn meal."

[1] Average of years ended Dec. 31. International Yearbook of Agricultural Statistics.
[2] Year ended Dec. 31.
[3] Trade sources.
[4] 3-year average.
[5] International Crop Report and Agricultural Statistics.
[6] Average of years ended July 31, from International Institute of Agricultural Statistics.
[7] Java and Madura only.
[8] 2-year average.
[9] 4-year average.
[10] Average for Austria-Hungary.
[11] 1 year only.

Table 55.—*Corn: Visible supply in United States,*[1] *1909–1929*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	2, 653	3, 289	8, 465	9, 764	13, 480	13, 778	10, 603	5, 940	5, 146	3, 770	2, 750	5, 011
1910	3, 510	1, 545	5, 099	9, 145	11, 794	11, 166	7, 047	4, 685	7, 482	7, 100	6, 724	6, 339
1911	1, 703	2, 054	5, 140	6, 900	14, 257	15, 914	7, 490	5, 699	8, 204	2, 451	1, 823	3, 101
1912	2, 689	1, 525	5, 879	9, 717	17, 918	21, 494	7, 270	2, 549	11, 479	6, 389	2, 612	7, 308
1913	6, 206	2, 026	12, 126	16, 505	18, 374	18, 812	9, 380	4, 409	7, 589	3, 203	3, 923	5, 461
1914	3, 114	3, 382	19, 703	34, 156	41, 238	32, 877	20, 203	12, 795	5, 225	2, 306	2, 382	3, 444
1915	3, 288	4, 387	8, 919	14, 773	24, 605	27, 697	21, 004	14, 505	6, 870	5, 167	3, 330	5, 093
1916	2, 361	2, 677	5, 838	10, 671	12, 931	11, 974	7, 173	2, 629	3, 277	2, 841	2, 371	1, 163
1917	1, 277	1, 932	3, 155	4, 623	8, 939	19, 016	16, 111	13, 038	11, 487	9, 466	5, 232	5, 503
1918	4, 733	2, 216	2, 415	5, 549	4, 483	2, 514	4, 245	2, 600	4, 038	2, 461	956	2, 163
1919	1, 484	1, 477	2, 921	3, 575	4, 951	5, 669	5, 035	2, 740	4, 364	6, 152	2, 564	7, 587
1920	10, 085	4, 597	5, 409	14, 297	22, 333	32, 896	23, 018	15, 103	24, 304	14, 584	11, 500	11, 765
1921	18, 891	15, 518	23, 279	30, 778	44, 792	46, 889	35, 564	27, 046	29, 337	19, 509	7, 314	12, 206
1922	8, 806	11, 072	16, 760	21, 658	27, 529	28, 742	22, 339	6, 734	3, 366	2, 373	1, 587	2, 052
1923	809	2, 690	8, 799	9, 379	18, 898	26, 074	17, 978	12, 288	8, 279	4, 887	5, 070	7, 154
1924	8, 097	7, 563	18, 573	27, 571	32, 292	32, 727	23, 379	17, 140	13, 094	6, 093	6, 524	5, 470
1925	1, 790	2, 461	17, 861	28, 092	33, 878	36, 485	32, 408	25, 453	30, 333	24, 930	19, 771	17, 381
1926	22, 258	28, 699	34, 712	38, 792	45, 103	47, 244	36, 621	29, 961	34, 427	30, 205	22, 312	23, 687
1927	20, 574	19, 216	27, 034	31, 849	40, 998	43, 856	33, 556	25, 496	16, 008	13, 267	9, 516	6, 791
1928	2, 030	6, 419	17, 146	26, 042	33, 302	34, 150	25, 687	14, 259	13, 054	8, 751	5, 417	4, 197
1929	3, 237	3, 267										

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin.

[1] Saturday nearest the 1st of each month.

Table 56.—*Corn: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC CORN IN UNITED STATES[1]

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27			36, 019	40, 670	47, 515	49, 759	39, 010	31, 224	36, 268	31, 782	23, 324	24, 913
1927–28	21, 661	20, 254	28, 741	30, 717	44, 786	48, 273	36, 835	27, 497	17, 650	12, 304	9, 768	6, 894
1928–29	2, 032	6, 353	18, 565	28, 797	36, 927	37, 744	28, 863	15, 951	13, 740	9, 086	6, 340	4, 421
1929–30	3, 639	2, 982										

UNITED STATES CORN IN CANADA

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
1926–27			2, 147	1, 715	1, 788	1, 403	1, 781	1, 452	1, 184	1, 706	1, 188	2, 010
1927–28	1, 994	2, 263	1, 891	1, 598	1, 312	976	626	1, 634	1, 337	818	510	534
1928–29	252	268	580	737	601	356	1, 759	1, 602	911	746	480	987
1929–30	847	375										

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes corn in store in public and private elevators in 39 important markets and also the corn afloat in vessels or barges in the harbors of lake and seaboard ports. Corn in transit either by rail or water, mill stocks, or small private stocks of corn intended only for local purposes, not included.

TABLE 57.—*Corn: Stocks of old corn on farms November 1, by selected States and by geographic divisions, 1909–1929*

[In millions of bushels]

Year	Principal producing States							Geographic divisions					
	Iowa	Illinois	Nebraska	Missouri	Indiana	Ohio	Total	North Atlantic	East North Central	West North Central	South Atlantic	South Central	Far Western
1909	12.9	10.5	9.3	7.3	4.4	3.8	48.2	2.0	21.8	37.0	5.3	13.6	.1
1910	30.5	21.9	14.1	6.9	10.9	8.0	82.3	2.4	44.1	53.6	4.7	10.6	.3
1911	18.6	19.6	9.6	17.6	8.3	5.0	78.7	3.6	36.0	58.5	7.4	18.1	.3
1912	8.9	10.4	2.5	4.6	4.9	4.2	35.5	3.5	22.3	21.5	6.5	10.8	.1
1913	23.8	24.3	6.5	15.9	11.0	7.8	89.3	3.7	47.1	60.8	7.2	18.7	.4
1914	14.2	9.0	2.9	5.2	6.3	5.4	43.0	2.6	24.9	28.0	9.4	14.9	.2
1915	27.3	10.2	7.8	3.2	6.5	5.0	60.0	2.9	26.7	47.9	7.7	10.2	.6
1916	5.4	10.1	7.0	6.7	6.7	5.4	41.3	2.9	24.2	33.5	9.5	17.4	.5
1917	4.0	3.6	3.9	1.9	2.6	1.7	17.7	1.8	9.1	12.6	4.6	6.2	.1
1918	14.4	16.7	15.0	16.9	7.9	2.2	73.1	2.8	27.2	52.4	10.4	21.5	.3
1919	11.7	13.8	4.3	4.0	6.6	2.3	42.7	2.4	24.3	26.0	7.6	9.2	.3
1920	33.2	21.6	12.9	6.4	10.5	8.1	92.7	5.0	44.6	62.4	8.3	17.9	.7
1921	61.6	28.3	51.1	21.3	21.1	14.1	197.5	6.1	71.3	167.9	13.2	24.0	3.3
1922	38.8	15.9	24.9	11.0	10.2	9.3	110.1	6.0	42.0	99.3	8.0	20.7	1.3
1923	17.7	6.3	4.7	6.4	4.4	6.0	45.5	4.4	22.9	38.3	6.4	11.3	.5
1924	18.3	11.8	10.3	5.1	9.6	5.8	60.9	3.7	30.9	50.7	8.3	7.2	1.6
1925	6.1	8.0	7.7	4.5	2.8	1.8	30.9	2.1	13.9	30.0	4.1	7.7	.5
1926	34.5	35.5	20.1	10.7	20.3	16.2	137.3	6.2	80.5	79.8	6.5	9.1	.9
1927	20.0	21.9	4.5	7.0	12.6	8.8	74.8	3.8	46.8	37.1	7.6	17.7	.4
1928	5.0	2.8	11.7	3.2	2.0	1.4	26.1	2.3	7.1	30.1	5.4	8.2	.6
1929	16.3	11.0	6.4	5.4	4.7	3.4	47.2	2.5	21.7	40.9	4.0	6.6	.8

Bureau of Agricultural Economics. Compiled from estimates which are based on percentages of crop on farms as estimated by crop reporters. Stocks as given here are comparable with United States totals in Table 52, except for 1909 and 1910, for which years revisions are not available by States and geographic regions to make them comparable with the latest revisions of the United States total.

TABLE 58.—*Corn: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning November	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	60.0	60.1	63.8	65.6	65.7	64.5	64.4	65.7	66.7	66.8	63.7	56.8	63.2
1910	50.3	48.1	48.6	49.0	49.3	50.8	53.4	57.6	62.9	65.8	65.8	65.2	53.5
1911	63.2	62.0	63.4	65.6	58.8	75.2	81.0	81.8	80.2	78.4	73.9	64.3	68.8
1912	53.6	48.8	49.8	51.4	53.0	55.2	58.7	61.9	64.3	70.4	75.4	73.0	56.7
1913	69.9	69.4	69.0	68.7	69.9	71.4	73.6	75.2	76.2	79.2	79.8	74.4	71.8
1914	67.5	65.3	69.5	74.0	75.1	76.4	77.8	77.8	78.3	78.1	83.9	66.2	71.4
1915	59.7	59.8	64.4	67.4	69.2	71.3	73.2	74.8	77.4	81.5	83.0	83.6	69.6
1916	87.0	89.4	92.9	98.4	107.2	132.0	155.4	162.4	180.6	186.0	175.3	160.6	119.0
1917	137.0	131.4	136.8	146.6	154.0	154.6	154.1	153.1	156.7	162.7	162.6	149.9	148.1
1918	138.4	140.6	141.4	137.6	143.4	156.1	166.9	173.8	183.8	188.3	169.6	143.6	153.1
1919	134.0	137.4	143.6	147.6	153.6	164.1	177.4	185.4	174.6	159.7	138.5	104.3	151.5
1920	77.2	66.8	64.6	63.4	63.8	61.2	61.0	62.4	62.0	59.0	53.6	46.0	61.2
1921	41.7	42.8	44.6	50.3	55.8	58.3	60.6	61.9	63.3	63.6	62.2	62.2	54.3
1922	64.3	67.6	70.2	72.5	75.3	79.6	84.0	85.8	87.0	87.0	86.2	84.8	76.7
1923	78.3	72.2	73.6	76.5	77.2	78.2	78.6	80.8	98.3	107.4	109.7	108.9	84.0
1924	99.6	105.6	112.0	114.5	112.1	103.8	107.5	111.0	104.4	106.5	98.8	83.0	105.8
1925	74.6	70.7	69.6	68.5	66.6	65.7	67.1	68.6	71.5	79.5	76.2	74.5	71.0
1926	66.0	64.5	64.3	66.5	65.2	65.6	73.0	88.9	92.4	97.7	95.3	87.6	74.9
1927	73.7	75.1	75.2	79.0	86.2	91.9	102.5	102.2	102.4	98.2	95.1	84.7	85.2
1928	75.4	76.1	80.2	86.8	88.7	87.5	86.2	86.9	91.2	95.9	97.2	91.9	85.8
1929	81.0	78.0											

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of corn for each state; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, November, 1909–December, 1923.

TABLE 59.—*Corn, No. 3, yellow: Weighted average price[1] per bushel of reported cash sales, Chicago, 1909–1929*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Weighted average[1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	59	59	64	63	61	57	60	59	62	64	58	50	59
1910	49	45	45	45	45	50	54	55	63	65	67	73	53
1911	68	61	62	64	68	78	79	75	68	79	74	65	71
1912	52	46	46	48	49	55	57	60	62	74	75	70	53
1913	72	66	62	62	64	67	70	72	71	82	79	73	70
1914	67	64	71	74	72	75	77	74	78	81	74	65	70
1915	63	69	74	74	73	76	75	74	81	85	86	96	79
1916	98	92	98	100	109	140	159	170	199	206	210	203	111
1917	221	177	177	181	170	165	160	162	170	172	158	141	163
1918	133	145	143	127	153	162	174	178	192	195	155	141	162
1919	146	147	151	146	158	169	202	189	158	158	131	91	159
1920	77	74	65	63	62	57	60	63	60	56	53	45	62
1921	47	47	48	55	57	58	62	61	64	62	64	69	55
1922	71	73	70	72	73	79	82	84	88	88	89	104	73
1923	82	71	76	78	77	77	77	82	109	117	114	110	88
1924	111	120	124	122	117	105	115	113	108	102	91	82	106
1925	83	76	79	75	72	71	71	70	78	80	79	77	75
1926	71	75	74	73	68	71	87	99	102	109	97	84	87
1927	84	86	89	95	90	106	108	103	106	102	100	96	101
1928	84	83	93	94	94	90	87	91	99	101	101	95	92
1929	88	88											

Bureau of Agricultural Economics. Compiled from Chicago Daily Trade Bulletin. Data for 1899–1908 available in 1924 Yearbook, p. 612, Table 73.

[1] Average of daily prices weighted by car-lot sales.

TABLE 60.—*Corn: Weighted average price[1] per bushel of reported cash sales of all classes and grades, Chicago, and six markets combined, 1918–1929*

CHICAGO

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Weighted average[1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1918	118.6	138.6	131.4	122.0	144.2	160.1	174.0	173.7	191.8	193.2	156.6	140.0	150.4
1919	143.8	141.6	144.9	139.5	155.1	159.7	197.4	183.3	155.3	154.9	132.2	95.9	144.1
1920	78.8	72.5	62.1	59.9	60.7	54.5	61.2	59.1	59.4	56.2	53.2	46.2	56.6
1921	46.7	47.1	47.3	54.0	57.1	58.2	61.4	60.0	63.7	62.0	63.0	69.0	56.9
1922	71.1	72.4	70.1	72.5	72.8	79.3	81.8	84.0	87.1	88.2	88.8	102.4	78.1
1923	76.1	69.8	74.4	75.2	74.4	76.4	76.7	82.6	109.1	117.2	114.9	110.0	86.0
1924	109.3	115.3	113.1	110.8	103.8	99.1	113.4	111.6	106.1	101.8	89.4	80.9	105.7
1925	70.3	67.8	69.5	63.1	65.2	65.3	67.4	65.7	74.0	76.1	75.9	73.1	68.4
1926	66.5	65.3	64.5	62.1	59.4	66.5	81.5	91.2	96.1	105.2	92.1	79.5	74.9
1927	79.8	78.9	78.7	84.0	89.4	98.8	104.6	101.3	104.7	100.3	98.6	88.8	91.0
1928	80.7	79.8	89.0	91.2	91.7	88.0	86.1	91.5	99.9	101.0	100.9	94.6	90.5
1929	81.7	81.0											

SIX MARKETS COMBINED[2]

1918	122.5	140.4	133.0	123.0	143.1	160.6	172.2	173.9	189.9	191.5	156.1	139.9	150.3
1919	143.2	140.4	143.2	137.9	153.1	163.8	191.7	181.0	154.8	153.2	130.1	94.3	146.5
1920	76.5	68.6	60.3	58.1	58.8	52.9	58.9	48.3	57.5	54.0	51.9	45.2	55.5
1921	45.6	45.7	46.0	53.3	55.4	56.5	59.6	59.3	62.1	60.1	62.3	69.4	55.7
1922	70.8	71.6	69.2	71.6	72.4	79.0	82.1	83.1	85.6	86.4	88.3	100.3	77.4
1923	74.9	67.5	72.8	73.7	72.7	74.7	75.4	82.7	106.6	114.4	113.7	109.2	83.0
1924	108.3	114.4	112.9	108.6	103.5	99.0	111.9	109.7	105.3	101.3	89.1	80.8	106.0
1925	71.0	68.3	69.5	63.2	64.6	66.4	68.0	66.9	76.3	78.3	76.5	73.2	69.0
1926	67.3	65.9	65.2	62.7	60.9	67.0	83.0	91.5	96.7	104.2	92.2	79.9	75.8
1927	78.7	77.0	78.6	84.1	89.6	98.2	104.0	100.8	102.7	96.8	97.5	89.3	89.2
1928	79.8	78.4	87.1	89.5	89.0	86.9	84.6	89.7	98.1	99.9	100.0	93.8	88.5
1929	81.0	79.1											

Bureau of Agricultural Economics. Compiled from Chicago Daily Trade Bulletin, St. Louis Daily Market Reporter, Omaha Daily Price Current, Kansas City Grain Market Review, Minneapolis Daily Market Record, Cincinnati Daily Trade Bulletin. The prices in this table are comparable with prices paid to producers in that the latter are averages of the several prices reported which cover all classes and grades sold by producers.

[1] Average of daily prices weighted by car-lot sales.
[2] Markets are Chicago, St. Louis, Omaha, Kansas City, Minneapolis, and Cincinnati (not included from November, 1918, through December, 1919.)

TABLE 61.—*Corn, yellow, La Plata: Spot price per bushel of 56 pounds at Buenos Aires, 1912–1929*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1912	52	53	54	54	54	56	55	55	55	55	62	59	55
1913	58	58	55	56	56	54	59	55	57	[1] 56	55	49	56
1914	53	54	54	61	56	57	54	50	51	49	51	51	53
1915	54	52	56	60	56	51	45	43	45	51	55	70	53
1916	103	93	107	107	99	103	127	146	143	127	87	85	110
1917	95	88	79	79	74	59	53	57	64	68	65	63	70
1918	63	63	57	52	47	55	55	55	96	107	91	79	68
1919	74	71	70	71	83	103	113	110	96	90	92	83	88
1920	77	82	88	91	91	78	61	63	65	66	65	58	74
1921	61	63	63	73	79	77	75	71	78	78	76	74	72
1922	70	74	80	82	81	80	77	75	73	69	74	78	76
1923	81	79	78	82	77	67	65	57	68	85	93	105	78
1924	106	107	112	108	96	92	100	92	93	96	91	82	98
1925	84	86	78	73	66	70	68	68	68	70	65	60	71
1926	56	55	60	63	62	60	60	63	70	76	77	76	65
1927	75	83	86	97	102	95	90	91	90	86	91	94	91
1928	97	93	97	99	90	91	79	87	87	87	87	84	90
1929	82	79	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from International Yearbook of Agricultural Statistics, 1912–1921; subsequently Review of the River Plate. Average of weekly quotations. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins.

[1] Interpolation, no quotation.

TABLE 62.—*Corn, yellow, La Plata: Spot price per bushel of 56 pounds at Liverpool, 1912–1929*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1912	68	67	71	75	76	74	72	69	67	67	70	66	70
1913	63	67	65	66	68	68	74	76	78	97	93	83	75
1914	78	83	98	106	102	106	111	97	92	90	85	94	95
1915	106	119	140	144	142	143	147	133	145	154	139	148	138
1916	169	181	189	192	200	216	(1)	217	217	217	217	217	203
1917	217	217	223	223	223	223	223	223	242	261	261	261	233
1918	261	261	204	204	175	174	174	172	165	166	169	168	191
1919	165	152	[2] 149	[3] 177	[3] 196	197	181	167	153	143	160	149	166
1920	115	125	128	122	130	128	118	109	105	93	83	72	111
1921	78	88	92	108	108	103	106	101	110	110	109	108	102
1922	96	100	99	104	105	109	114	110	102	94	98	97	102
1923	96	102	103	115	111	107	112	100	94	104	114	124	107
1924	121	122	131	129	114	111	130	128	127	138	120	103	123
1925	107	110	97	91	89	94	89	87	100	98	90	93	95
1626	95	92	89	93	87	88	94	93	91	98	97	96	93
1927	97	104	110	119	127	129	127	125	123	119	107	116	117
1928	123	120	124	127	124	120	107	104	118	113	107	103	116
1929	99	89	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from International Yearbook of Agricultural Statistics 1912–1921; subsequently Broomhall's Corn Trade News. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subseqently at par of exchange

[1] Not quoted. [2] Afloat price. [3] Nominal.

TABLE 63.—*Corn futures: Volume of trading in all "contract" markets, by months 1923–24 to 1928–29*

Year and market	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923–24	394, 517	284, 884	457, 145	337, 730	441, 631	323, 270	287, 875
1924–25	557, 304	706, 562	709, 377	677, 274	810, 362	669, 751	510, 347
1925–26	317, 253	514, 258	302, 297	236, 083	316, 906	291, 590	237, 152
1926–27	383, 247	394, 929	261, 079	287, 881	428, 858	312, 646	692, 490
1927–28	472, 862	681, 076	510, 743	698, 043	732, 790	745, 222	699, 564
1928–29	457, 429	419, 906	689, 843	372, 926	415, 705	466, 393	525, 642
Chicago Board of Trade	418, 806	384, 587	636, 665	340, 898	380, 331	426, 574	482, 265
Chicago Open Board	12, 946	9, 666	19, 718	12, 463	13, 141	12, 127	14, 512
Kansas City	20, 736	21, 036	27, 243	15, 959	18, 115	23, 787	25, 360
St. Louis	1, 740	1, 174	1, 971	1, 285	1, 611	1, 258	879
Milwaukee	3, 201	3, 443	4, 246	2, 321	2, 507	2, 647	2, 626

TABLE 63.—*Corn futures: Volume of trading in all "contract" markets, by months 1923–24 to 1928–29*—Continued

Year and market	June	July	Aug.	Sept.	Oct.	Total
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1923–24	426, 225	565, 184	740, 107	694, 881	677, 665	5, 631, 114
1924–25	565, 855	462, 734	394, 331	441, 945	335, 161	6, 841, 003
1925–26	342, 491	448, 305	438, 929	367, 625	340, 191	4, 153, 080
1926–27	921, 473	575, 266	712, 669	835, 732	587, 568	6, 393, 838
1927–28	566, 913	553, 603	615, 609	371, 817	466, 952	7, 115, 194
1928–29	475, 255	519, 678	452, 684	296, 188	268, 949	5, 360, 551
Chicago Board of Trade	436, 467	481, 869	418, 505	271, 827	245, 604	4, 924, 398
Chicago Open Board	11, 125	11, 414	10, 576	8, 814	8, 025	144, 485
Kansas City	24, 161	22, 771	21, 496	13, 343	13, 075	247, 082
St. Louis	794	377	316	235	245	22, 537
Milwaukee	2, 708	3, 247	1, 791	1, 969	2, 000	32, 706

Grain Futures Administration.

TABLE 64.—*Oats: Acreage, production, value, exports, etc., United States, 1900–1929*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago, year beginning Aug. 1[1]	Foreign trade, including meal, year beginning July 1[2]			
							Domestic exports	Imports	Net exports[3]	
									Total	Percentage of production
	1,000 acres	*Bushels of 32 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1900	30, 290	30. 2	913, 800	25. 4	232, 074	26	42, 269	32	42, 237	4. 6
1901	29, 894	26. 0	778, 392	39. 7	308, 796	43	13, 278	39	13, 240	1. 7
1902	30, 578	34. 5	1, 053, 489	30. 6	322, 423	34	8, 382	150	8, 233	. 8
1903	30, 866	28. 2	869, 350	34. 0	295, 232	38	1, 961	184	1, 857	. 2
1904	31, 353	32. 2	1, 008, 931	31. 1	313, 488	32	8, 395	56	8, 339	. 8
1905	32, 072	34. 0	1, 090, 236	28. 9	314, 868	31	48, 435	40	48, 395	4. 4
1906	33, 353	31. 0	1, 035, 576	31. 9	329, 853	37	6, 386	91	6, 379	. 6
1907	33, 641	23. 9	805, 108	44. 5	358, 421	50	2, 519	383	2, 195	. 3
1908	34, 006	25. 0	850, 540	47. 3	402, 010	52	2, 334	6, 692	[4] 4, 252	
1909	*35, 159*	*28. 6*	*1, 007, 143*							
1909	35, 159	30. 4	1, 068, 289	40. 6	433, 869	42	2, 549	1, 063	1, 704	. 2
1910	37, 548	31. 6	1, 186, 341	34. 4	408, 388	33	3, 846	140	3, 707	. 3
1911	37, 763	24. 4	922, 298	45. 0	414, 663	50	2, 678	2, 660	30	(5)
1912	37, 917	37. 4	1, 418, 337	31. 9	452, 469	35	36, 455	765	35, 695	2. 5
1913	38, 399	29. 2	1, 121, 768	39. 2	439, 596	40	2, 749	22, 333	[4] 18, 858	
1914	38, 442	29. 7	1, 141, 060	43. 8	499, 431	50	100, 609	670	100, 158	8. 8
1915	40, 996	37. 8	1, 549, 030	36. 1	559, 506	41	98, 960	720	98, 648	6. 4
1916	41, 527	30. 1	1, 251, 837	52. 4	655, 928	54	95, 106	841	94, 348	7. 5
1917	43, 553	36. 6	1, 592, 740	66. 6	1, 061, 474	71	125, 091	2, 915	122, 273	7. 7
1918	44, 349	34. 7	1, 538, 124	70. 9	1, 090, 322	70	109, 005	838	108, 167	7. 0
1919	*37, 991*	*27. 8*	*1, 055, 183*							
1919	40, 359	29. 3	1, 184, 030	70. 4	833, 922	80	43, 436	6, 077	37, 365	3. 2
1920	42, 491	35. 2	1, 496, 281	46. 0	688, 311	51	9, 391	3, 827	5, 831	. 4
1921	45, 495	23. 7	1, 078, 341	30. 2	325, 954	35	21, 237	1, 824	19, 422	1. 8
1922	40, 790	29. 8	1, 215, 803	39. 4	478, 948	41	25, 413	340	25, 087	2. 1
1923	40, 981	31. 9	1, 305, 883	41. 4	541, 137	45	8, 796	4, 271	4, 550	. 3
1924	*37, 650*	*34. 7*	*1, 304, 599*							
1924	42, 110	35. 7	1, 502, 529	47. 7	717, 189	50	16, 777	3, 067	13, 926	. 9
1925	44, 872	33. 2	1, 487, 550	38. 0	565, 506	41	39, 687	212	39, 565	2. 7
1926	44, 177	28. 2	1, 246, 848	39. 8	496, 582	43	15, 041	135	14, 988	1. 2
1927	41, 941	28. 2	1, 182, 594	45. 0	531, 762	55	9, 823	233	9, 611	. 8
1928	41, 734	34. 5	1, 439, 407	40. 9	589, 048	44	16, 242	426	15, 817	1. 1
1929 [6]	40, 217	30. 8	1, 238, 654	43. 5	538, 445					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 788, for data for earlier years.

[1] From Chicago Daily Trade Bulletin, averages of the daily cash quotations of No. 3 white oats weighted by car-lot sales.
[2] Compiled from Commerce and Navigation of the United States, 1900–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919-1926; January and June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce. Oats—general imports, 1900–1929; oatmeal—general imports, 1900–1909; imports for consumption, 1910–1929.
[3] Total exports (domestic plus foreign) minus total imports.
[4] Net imports. Total imports minus total exports (domestic plus foreign).
[5] Less than 0.05 per cent.
[6] Preliminary.

TABLE 65.—*Oats: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage harvested					Production				
	Average, 1923–1927	1926	1927	1928	1929 [1]	Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	129	136	124	120	122	5,041	5,168	4,588	4,200	4,880
New Hampshire	13	11	11	10	10	488	440	429	390	400
Vermont	81	82	83	79	74	3,068	3,116	3,237	2,686	2,738
Massachusetts	9	9	8	7	7	303	306	280	224	266
Rhode Island	2	3	2	2	2	64	96	64	56	60
Connecticut	13	15	15	15	14	411	480	480	405	420
New York	998	1,017	1,000	1,020	989	34,555	34,578	35,000	33,660	24,626
New Jersey	53	50	49	50	47	1,597	1,650	1,764	1,500	1,410
Pennsylvania	1,109	1,111	1,100	1,067	1,014	37,159	35,552	39,600	34,678	29,913
North Atlantic	2,406	2,434	2,392	2,370	2,279	82,686	81,386	85,442	77,799	64,713
Ohio	1,799	1,980	1,900	2,413	1,689	67,388	75,240	60,800	89,281	49,826
Indiana	1,950	2,050	1,948	2,430	1,895	57,626	61,500	48,700	89,910	54,008
Illinois	4,352	4,661	4,008	4,649	4,231	137,839	123,516	102,204	174,338	141,738
Michigan	1,569	1,570	1,617	1,633	1,372	53,078	51,810	54,170	58,461	40,886
Wisconsin	2,546	2,577	2,422	2,495	2,470	102,379	96,638	93,247	108,532	85,215
Minnesota	4,488	4,532	4,350	4,089	4,212	159,745	129,162	116,580	153,338	153,738
Iowa	6,014	6,218	6,001	6,004	5,944	217,338	195,867	192,032	231,154	219,928
Missouri	1,734	2,173	1,565	1,706	1,535	39,063	43,460	26,605	47,768	33,770
North Dakota	2,301	2,024	2,125	1,934	1,934	57,504	34,408	45,688	59,954	34,812
South Dakota	2,501	1,984	2,550	2,193	2,250	75,496	23,213	74,715	59,211	64,382
Nebraska	2,518	2,537	2,441	2,392	2,480	69,220	52,516	69,813	78,936	86,304
Kansas	1,469	1,626	1,301	1,301	1,197	34,844	35,122	30,574	37,729	28,249
North Central	33,242	33,932	32,228	33,239	31,218	1,071,519	922,452	915,128	1,188,612	992,856
Delaware	5	4	4	4	3	126	112	116	120	84
Maryland	53	52	51	54	43	1,713	1,706	1,708	1,701	1,333
Virginia	181	186	186	182	167	4,156	4,836	3,999	4,641	3,841
West Virginia	192	207	217	204	216	4,885	5,796	5,251	5,712	5,616
North Carolina	280	310	273	191	258	5,740	6,820	5,733	4,202	6,192
South Carolina	410	416	449	337	408	9,148	10,483	10,327	7,751	11,016
Georgia	425	475	442	265	424	8,174	10,925	9,282	5,300	9,540
Florida	16	12	11	11	12	209	200	121	191	168
South Atlantic	1,562	1,662	1,633	1,248	1,531	34,151	40,878	36,537	29,618	37,790
Kentucky	236	259	215	305	290	5,159	6,346	4,085	7,930	6,235
Tennessee	212	276	179	188	197	4,565	6,900	3,043	4,042	3,546
Alabama	148	107	101	70	119	2,587	2,354	1,768	1,225	2,320
Mississippi	74	41	48	41	55	1,382	902	912	820	1,210
Arkansas	247	213	207	155	186	4,872	5,346	4,140	3,410	4,836
Louisiana	35	30	35	44	48	754	798	612	1,078	1,200
Oklahoma	1,198	1,340	1,112	890	792	27,774	37,520	21,128	23,140	20,592
Texas	1,577	1,964	2,003	1,402	1,682	46,492	83,666	42,063	35,751	47,096
South Central	3,727	4,260	3,900	3,095	3,369	93,585	143,832	77,751	77,396	87,035
Montana	613	641	596	554	554	18,510	16,666	23,840	20,221	9,418
Idaho	151	119	143	137	151	6,642	4,760	6,721	6,439	6,040
Wyoming	133	120	120	132	145	4,514	4,200	4,320	3,828	4,205
Colorado	211	195	189	193	212	5,794	4,680	5,481	5,983	6,572
New Mexico	47	54	30	36	43	1,034	1,512	660	720	1,161
Arizona	15	15	17	14	15	469	525	612	532	480
Utah	60	54	51	55	58	2,398	2,160	2,142	2,475	2,436
Nevada	2	2	2	2	2	78	64	80	80	70
Washington	210	229	183	201	191	9,776	9,847	9,150	9,447	8,977
Oregon	297	304	310	304	304	9,657	8,816	10,540	10,944	12,464
California	140	156	147	154	145	4,266	5,070	4,190	5,313	4,437
Far Western	1,880	1,889	1,788	1,782	1,820	63,140	58,300	67,736	65,982	56,260
United States	42,816	44,177	41,941	41,734	40,217	1,345,081	1,246,848	1,182,594	1,439,407	1,238,654

Bureau of Agricultural Economics. Estimates of crop-reporting board.

[1] Preliminary.

TABLE 66.—*Oats: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State and division	Yield per acre							Estimated price per bushel						
	Av., 1918–1927	1924	1925	1926	1927	1928	1929	Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	38.4	38.0	45.0	38.0	37.0	35.0	40.0	61	65	55	63	68	70	70
New Hampshire	37.8	39.0	39.0	40.0	39.0	39.0	40.0	67	73	64	65	70	65	70
Vermont	36.2	38.0	40.0	38.0	39.0	34.0	37.0	63	69	59	60	65	70	65
Massachusetts	34.8	34.0	38.0	34.0	35.0	32.0	38.0	68	70	65	70	70	70	70
Rhode Island	31.8	30.0	33.0	32.0	32.0	28.0	30.0	69	75	65	70	75	70	75
Connecticut	31.0	29.0	33.0	32.0	32.0	27.0	30.0	66	70	61	66	69	70	70
New York	33.2	36.0	36.0	34.0	35.0	33.0	24.9	55	62	52	50	55	54	58
New Jersey	31.0	30.0	30.0	33.0	36.0	30.0	30.0	55	64	54	50	53	53	57
Pennsylvania	34.0	36.0	35.0	32.0	36.0	32.5	29.5	54	62	51	49	54	53	57
North Atlantic	33.9	36.0	36.0	33.4	35.7	32.8	28.4	55.2	62.6	52.2	51.0	55.8	55.1	58.9
Ohio	35.8	41.0	41.5	38.0	32.0	37.0	29.5	44	52	39	39	45	42	45
Indiana	30.8	37.0	28.0	30.0	25.0	37.0	28.5	40	48	37	35	43	37	40
Illinois	32.7	39.0	32.5	26.5	25.5	37.5	33.5	40	47	35	35	43	38	40
Michigan	32.6	38.8	32.0	33.0	33.5	35.8	29.8	44	48	40	40	48	43	48
Wisconsin	39.1	40.0	48.5	37.5	38.5	43.5	34.5	43	48	38	40	47	43	44
Minnesota	34.3	43.0	42.0	28.5	26.8	37.5	36.5	36	43	31	34	40	35	37
Iowa	36.0	42.0	39.2	31.5	32.0	38.5	37.0	38	44	32	35	42	37	39
Missouri	23.6	25.0	26.0	20.0	17.0	28.0	22.0	46	51	44	42	47	42	47
North Dakota	23.8	34.0	27.0	17.0	21.5	31.0	18.0	32	36	27	33	35	30	32
South Dakota	30.1	37.0	34.0	11.7	29.3	27.0	28.5	34	40	28	36	36	33	34
Nebraska	27.8	28.0	27.4	20.7	28.6	33.0	34.8	39	43	36	40	40	38	38
Kansas	23.9	25.0	23.0	21.6	23.5	29.0	23.6	45	47	44	44	45	42	46
North Central	32.0	37.5	34.9	27.2	28.4	35.8	31.8	39.1	44.8	34.4	36.9	42.2	38.0	39.8
Delaware	28.0	30.0	27.0	28.0	29.0	30.0	28.0	64	66	65	59	68	60	57
Maryland	31.3	34.0	32.0	32.8	33.5	31.5	31.0	55	64	53	50	54	56	59
Virginia	22.2	23.5	21.5	26.0	21.5	25.5	23.0	66	72	70	63	64	64	67
West Virginia	24.7	24.0	27.0	28.0	24.2	28.0	26.0	64	73	62	59	64	63	64
North Carolina	19.7	18.0	19.0	22.0	21.0	22.0	24.0	75	84	76	69	72	78	75
South Carolina	22.8	19.5	19.0	25.2	23.0	23.0	27.0	82	97	90	67	75	88	80
Georgia	19.4	15.5	17.0	23.0	21.0	20.0	22.5	82	95	87	69	75	85	80
Florida	14.3	13.5	14.0	16.7	11.0	17.4	14.0	81	90	90	65	80	88	89
South Atlantic	21.7	20.0	20.2	24.6	22.4	23.7	24.7	74.8	84.5	77.4	65.5	70.8	75.5	74.7
Kentucky	21.6	23.2	21.0	24.5	19.0	26.0	21.5	59	67	59	53	60	57	59
Tennessee	20.8	21.0	22.0	25.0	17.0	21.5	18.0	62	69	64	55	60	60	62
Alabama	18.6	15.0	17.0	22.0	17.5	17.5	19.5	77	87	78	68	70	75	76
Mississippi	18.7	16.0	19.0	22.0	19.0	20.0	22.0	75	85	78	66	70	75	76
Arkansas	21.8	18.0	16.0	22.0	20.0	22.0	26.0	59	64	58	52	58	59	62
Louisiana	22.2	20.0	21.0	26.6	17.5	24.5	25.0	72	83	80	64	66	65	70
Oklahoma	24.4	25.0	23.0	28.0	19.0	26.0	26.0	47	53	51	37	44	47	48
Texas	26.2	34.0	12.3	42.6	21.0	25.5	28.0	53	59	63	38	47	51	51
South Central	24.4	27.2	18.2	33.8	19.9	25.0	25.8	52.9	59.2	58.1	40.5	48.9	52.1	53.2
Montana	26.5	29.5	22.5	26.0	40.0	36.5	17.0	47	47	53	53	44	41	51
Idaho	40.7	36.0	49.0	40.0	47.0	47.0	40.0	48	58	43	45	50	48	48
Wyoming	32.2	30.0	35.0	35.0	36.0	29.0	29.0	48	58	46	45	42	45	51
Colorado	28.1	25.0	27.0	24.0	29.0	31.0	31.0	49	58	50	44	48	45	48
New Mexico	23.6	20.0	20.0	28.0	22.0	20.0	27.0	61	60	64	56	56	60	60
Arizona	32.7	28.0	30.0	35.0	36.0	38.0	32.0	76	81	75	75	70	75	80
Utah	38.2	32.8	47.0	40.0	42.0	45.0	42.0	62	70	62	60	60	56	60
Nevada	35.3	30.0	40.0	32.0	40.0	40.0	35.0	69	72	65	62	65	65	70
Washington	43.5	38.5	44.0	43.0	50.0	47.0	47.0	54	59	52	53	56	55	59
Oregon	31.3	28.0	33.0	29.0	34.0	36.0	41.0	52	61	51	50	53	51	56
California	29.9	18.2	34.7	32.5	28.5	34.5	30.6	64	87	61	48	63	60	61
Far Western	31.7	29.4	32.4	30.9	37.9	37.0	30.9	51.0	56.6	51.7	50.7	49.9	48.5	54.3
United States	31.0	35.7	33.2	28.2	28.2	34.5	30.8	42.4	47.7	38.0	39.8	45.0	40.9	43.5

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

TABLE 67.—*Oats: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual, 1927–1929*

Country	Acreage					Yield per acre					Production				
	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	9,597	14,585	13,240	13,137	12,479	36.6	31.4	33.2	34.4	22.7	351,690	457,918	439,713	452,153	282,838
United States	37,357	42,850	41,941	41,734	40,217	30.6	30.9	28.2	34.5	30.8	1,143,407	1,318,021	1,182,594	1,439,407	1,238,654
Total	46,954	57,435	55,181	54,871	52,696	31.8	30.9	29.4	34.5	28.9	1,495,097	1,775,969	1,622,307	1,891,560	1,521,492
EUROPE															
England and Wales	2,039	2,039	1,751	1,763	1,854	47.5	47.5	53.7	57.3	57.8	96,913	96,796	94,080	101,090	107,240
Scotland	952	970	897	878	889	46.8	49.0	48.4	56.1	59.4	44,507	47,563	43,400	49,280	52,850
Irish Free State	699	736	645	649	666	63.5	49.3	72.5	68.7	------	44,353	36,311	46,735	44,610	------
Northern Ireland	350	344	310	307	314	59.5	54.0	62.3	63.0	63.9	20,816	18,582	19,303	19,356	20,072
Norway	264	274	240	246	------	38.9	41.6	52.8	51.5	------	10,276	11,406	12,665	12,680	12,445
Sweden	1,961	1,807	1,723	1,716	1,755	43.9	41.7	43.8	48.5	46.8	86,050	75,374	75,404	83,191	82,197
Denmark	1,161	1,119	1,012	999	968	52.2	54.1	60.1	73.0	73.3	60,557	60,542	60,863	72,960	70,961
Netherlands	346	380	368	377	394	52.2	51.4	57.5	65.8	64.2	18,070	19,531	21,144	24,801	25,284
Belgium	668	656	658	667	729	65.8	62.4	70.1	72.7	66.9	43,964	40,954	46,102	48,524	48,771
Luxemburg	77	70	70	71	75	43.9	30.4	39.5	42.3	44.7	3,382	2,130	2,763	3,001	3,351
France	10,081	8,521	8,544	8,657	8,665	36.5	35.3	40.2	39.3	45.7	368,462	300,569	343,279	340,252	395,752
Spain	1,276	1,623	1,909	1,956	1,700	22.8	22.1	20.5	17.8	22.3	29,110	35,900	39,216	34,782	37,892
Portugal	(600)	563	577	581	------	------	11.4	9.6	8.7	------	(7,000)	6,422	5,528	5,053	6,037
Italy	1,276	1,194	1,203	1,286	1,355	29.4	31.7	25.5	37.6	36.2	37,537	37,840	30,720	48,412	48,988
Switzerland	81	51	51	51	51	59.1	54.7	56.5	57.4	56.7	4,784	2,790	2,880	2,928	2,890
Germany	9,529	8,246	8,589	8,695	8,793	55.3	44.1	50.9	55.4	57.8	527,178	363,272	437,249	481,960	508,633
Austria	883	739	769	744	742	32.9	30.5	39.3	42.8	41.6	29,030	22,556	30,231	31,841	30,837
Czechoslovakia	2,506	2,044	2,070	2,074	2,150	38.4	40.1	42.2	47.3	43.8	96,147	82,029	87,456	98,056	94,139
Hungary	849	785	643	655	718	33.5	28.8	35.0	42.0	36.0	28,464	22,644	22,513	27,529	25,828
Yugoslavia	1,358	923	936	943	980	24.7	22.4	21.5	26.8	24.7	33,516	20,644	20,111	25,236	24,166
Greece	[2] 140	206	255	277	274	[2] 29.1	20.3	18.2	18.9	11.7	[2] 4,075	4,187	4,650	5,246	3,213
Bulgaria	408	362	326	293	379	21.2	19.6	19.8	21.0	30.9	8,651	7,100	6,446	6,139	11,699
Rumania	[3] 2,119	3,133	2,680	2,759	2,997	[3] 28.2	20.1	22.3	24.5	31.2	[3] 59,776	62,819	59,810	67,546	93,647
Poland	6,666	4,446	4,896	5,036	5,037	29.4	27.2	30.1	34.2	34.7	195,825	120,813	147,360	172,076	174,991
Lithuania	961	842	766	712	865	23.8	27.4	21.9	25.8	28.3	22,910	23,078	16,741	18,377	24,457
Latvia	765	740	736	590	747	25.1	24.6	16.6	17.0	31.6	19,188	18,206	12,205	10,037	23,631
Estonia	394	[3] 390	360	320	372	24.9	[3] 23.3	18.7	21.3	28.1	9,795	9,505	6,727	6,817	10,451
Finland	999	1,058	1,112	1,140	1,124	20.4	32.6	39.2	34.4	34.5	20,391	34,529	43,609	39,255	38,732
Russia, European and Asiatic	41,256	25,561	43,961	41,957	46,455	22.4	20.2	20.2	26.0	------	924,918	516,279	885,860	1,091,504	------
Total Europe reporting area and production all years	47,848	42,688	42,634	42,966	43,927	39.1	35.8	39.3	42.3	44.6	1,869,098	1,529,953	1,674,265	1,818,692	1,960,672
Estimated European total excluding Russia	49,400	44,300	44,100	44,400	45,400	------	------	------	------	------	[4] 1,931,000	1,584,000	1,739,000	1,881,000	2,024,000

AFRICA															
Morocco	25	35	63	74	94	....	18.4	22.1	24.0	33.7	(500)	645	1,395	1,775	3,165
Algeria	449	605	535	601	619	30.0	21.0	19.8	24.1	23.5	13,489	12,713	10,606	14,492	14,520
Tunis	133	124	89	104	96	27.4	19.7	16.6	21.5	35.9	3,642	2,439	1,481	2,239	3,445
Total	607	764	687	779	809	29.0	20.7	19.6	23.8	26.1	17,631	15,797	13,482	18,506	21,130
ASIA															
Turkey	[2] 380	[5] 206	237	....	....	[2] 56.7	[2] 55.3	....	....	....	[3] 21,562	[2] 11,391	4,078	....	....
Syria and Lebanon	(12)	[3] 26	65	28	28	....	[3] 16.7	18.7	18.9	25.6	(175)	[3] 435	1,215	530	718
Japan	110	278	302	285	....	44.8	39.0	41.0	40.4	....	4,928	10,847	12,372	11,518	....
Chosen	141	276	272	265	....	15.6	16.5	15.4	15.3	....	2,202	4,545	4,178	4,061	....
Total Northern Hemisphere reporting area and production all years	95,421	100,913	98,567	98,644	97,460	35.4	32.9	33.6	37.8	36.0	3,382,001	3,322,154	3,311,269	3,729,288	3,504,012
Estimated Northern Hemisphere total excluding Russia and China	97,700	103,300	100,900	100,900	99,800	....	....	....	....	....	[4] 3,474,000	3,405,000	3,398,000	3,820,000	3,595,000
SOUTHERN HEMISPHERE															
Brazil	....	16	15	....	....	....	30.1	29.8	....	....	....	482	447	....	....
Chile	78	105	169	220	....	42.7	37.7	37.8	24.0	....	3,333	5,954	6,395	5,280	....
Uruguay	66	120	138	156	132	19.5	18.1	23.9	25.4	19.2	1,285	2,166	3,293	3,967	2,529
Argentina	2,396	2,662	3,160	3,608	3,734	22.6	22.3	16.5	18.1	18.2	54,246	59,286	52,290	65,173	68,019
Union of South Africa	809	640	565	630	639	11.9	9.5	10.5	12.1	17.0	9,661	6,093	5,952	7,598	10,842
Australia	745	1,000	1,122	1,054	....	23.8	19.0	15.5	16.2	....	17,768	19,010	15,105	17,081	....
New Zealand	366	125	88	73	275	49.1	48.0	53.4	51.2	....	17,978	5,996	4,695	3,736	....
Total Northern and Southern Hemisphere countries reporting area and production all years	98,692	104,335	102,430	103,038	101,965	34.9	32.5	32.9	36.9	35.2	3,447,193	3,389,699	3,372,804	3,806,026	3,585,402
Estimated world total excluding Russia and China	102,200	108,100	106,200	106,800	106,000	....	....	....	....	....	[4] 3,581,000	3,524,000	3,490,000	3,926,000	....

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Figures given are for crops harvested during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes in boundary have occurred the averages are estimates for territory within present boundaries.
[2] 1 year only.
[3] 4-year average.
[4] The estimate for the 5-year period, 1909–1913, given in this table is somewhat larger than the figure obtained by averaging the same 5 years in Table 68. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 68 they are for pre-war territory. As a result, in excluding Russia which lost territory in the war, a smaller area is excluded in this table than in Table 68.
[5] 2-year average.

TABLE 68.—*Oats: World production, 1894–1929*

Year	Estimated world production excluding Russia and China	Estimated European production excluding Russia	Selected countries							
			United States	Russia[1]	Germany	France	Canada	Poland	England and Wales	Argentina
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1894	2,303	1,451	716	744	453	294			119	
1895	2,503	1,432	886	717	430	306			105	
1896	2,320	1,376	780	800	411	296			93	
1897	2,232	1,282	791	664	394	253			99	1
1898	2,501	1,511	843	688	465	322			102	1
1899	2,633	1,462	926	995	474	308			99	2
1900	2,624	1,454	914	854	489	285			99	2
1901	2,344	1,415	778	624	486	255			91	2
1902	2,888	1,576	1,053	931	514	320			115	4
1903	2,829	1,649	869	800	542	344			109	3
1904	2,716	1,435	1,009	1,124	478	291			112	4
1905	2,823	1,460	1,090	937	451	306			99	6
1906	3,673	1,683	1,036	714	581	295			109	12
1907	2,861	1,768	805	921	630	353			121	34
1908	2,832	1,632	851	959	530	327	250		106	32
1909	3,415	1,863	1,068	1,163	629	383	353		104	36
1910	3,223	1,660	1,186	1,065	544	332	244		104	47
1911	3,135	1,683	922	876	531	349	365		96	69
1912	3,700	1,720	1,418	1,089	587	355	392		89	76
1913	3,580	1,909	1,122	1,251	669	357	405		91	43
1914	3,266	1,681	1,141	[2] 915	623	318	313		93	49
1915	3,594	1,401	1,549	[3] 897	412	339	465		101	75
1916	3,259	1,469	1,252	[4] 845	484	277	410		102	32
1917	3,217	1,047	1,593	761	[5] 250	[5] 220	403		106	69
1918	3,216	1,117	1,538		302	181	426		141	34
1919	3,038	1,318	1,184		310	180	394	76	110	31
1920	3,645	1,476	1,496	486	332	291	531	129	103	51
1921	3,076	1,451	1,078	359	345	244	426	92	100	31
1922	3,310	1,471	1,216	409	277	288	491	110	88	56
1923	3,755	1,719	1,306	405	421	337	564	153	95	76
1924	3,623	1,570	1,503	603	390	306	406	106	105	53
1925	3,764	1,708	1,488	805	385	328	402	144	97	80
1926	3,621	1,845	1,247	1,040	436	364	383	134	104	66
1927	3,490	1,739	1,183	886	437	343	440	147	94	52
1928	3,926	1,881	1,439	1,092	482	340	452	172	101	65
1929[6]		2,024	1,239		509	396	283	175	107	68

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. For each year is shown the production during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and the provinces of Batum and Elizabetpol, in Transcaucasia.
[4] Beginning this year estimates for the present territory of the Union of Socialist Soviet Republics exclusive of Turkestan, Transcaucasia, and the Far East, which territory in 1924 produced 20,248,000 bushels.
[5] Beginning with this year postwar boundaries and therefore not comparable with earlier years.
[6] Preliminary.

TABLE 69.—*Oats: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	4.7	16.4	13.5	11.1	7.7	7.8	8.3	8.0	7.1	6.5	4.0	4.9	100.0
1918	8.0	19.6	11.9	9.9	7.2	6.7	6.7	4.5	5.5	6.3	7.0	6.7	100.0
1919	14.4	18.4	10.1	9.2	5.8	8.3	8.2	6.6	4.9	4.3	5.2	4.6	100.0
1920	8.3	18.7	13.8	9.5	5.5	5.8	6.6	6.6	6.0	4.6	6.8	7.8	100.0
1921	15.1	16.5	11.8	7.9	5.3	6.1	7.3	6.9	5.6	4.3	7.2	6.0	100.0
1922	8.9	15.7	11.9	10.1	7.8	8.6	7.4	7.1	6.5	4.7	5.4	5.9	100.0
1923	7.0	17.7	14.1	11.5	6.8	7.6	7.7	7.9	5.2	4.8	4.8	4.9	100.0
1924	14.0	20.7	17.8	11.5	5.6	4.8	4.7	3.5	3.9	3.9	5.0	4.6	100.0
1925	10.4	22.2	13.2	9.3	6.3	6.8	6.1	6.2	5.2	4.2	4.5	5.6	100.0
1926	10.9	21.8	11.7	8.7	5.8	6.4	6.1	6.7	5.6	4.4	5.5	6.4	100.0
1927	9.3	22.7	13.8	9.7	5.7	6.7	6.3	6.3	6.2	3.8	4.1	5.4	100.0
1928	6.8	23.4	13.8	10.2	5.8	7.4	5.6	6.5	5.1	4.9	4.3	6.2	100.0

Bureau of Agricultural Economics.

TABLE 70.—*Oats: Farm stocks, growing conditions, and shipments, United States, 1909–1929*

Year beginning August	Stocks of old oats on farms Aug. 1 [1]	Conditions of new crop				Weight per measured bushel of new oats [2]	Stocks of oats on farms on Mar. 1 following [1]	Shipped out of county where grown [1]
		June 1	July 1	Aug. 1	Sept. 1			
	1,000 bush.	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*1,000 bush.*	*1,000 bush.*
1909	27,478	88.7	88.3	85.5	83.8	32.7	385,705	343,968
1910	66,666	91.0	82.2	81.5	83.3	32.7	442,665	363,103
1911	67,801	85.7	68.8	65.7	64.5	31.1	289,989	265,944
1912	34,875	91.1	89.2	90.3	92.3	33.0	604,249	438,130
1913	103,916	87.0	76.3	73.8	74.0	32.1	419,481	297,365
1914	62,467	89.5	84.7	79.4	75.8	31.5	379,369	335,539
1915	55,607	92.2	93.9	91.6	91.1	33.0	598,148	465,823
1916	113,728	86.9	86.3	81.5	78.0	31.2	394,211	355,092
1917	47,834	88.8	89.4	87.2	90.4	33.4	599,208	514,117
1918	81,424	93.2	85.5	82.8	84.4	33.2	590,251	421,568
1919	93,045	93.2	87.0	76.5	73.0	31.1	409,730	312,364
1920	54,819	87.8	84.7	87.2	88.3	33.1	683,759	431,687
1921	161,108	85.7	77.6	64.5	61.1	28.3	411,934	258,259
1922	74,513	85.5	74.4	75.6	74.9	32.0	421,118	303,950
1923	70,985	85.6	83.5	81.9	80.3	32.1	447,366	322,971
1924	65,710	83.0	86.9	88.2	89.3	33.4	538,832	422,112
1925	90,179	79.6	76.3	79.1	82.1	32.9	571,248	364,407
1926	107,917	78.8	74.5	71.4	67.9	30.9	421,897	272,804
1927	61,237	79.9	79.9	74.8	70.3	30.4	373,167	229,089
1928	42,315	78.3	79.9	84.8	84.4	32.6	497,335	308,215
1929 [3]	86,816	82.0	79.0	75.6	74.6	31.8	----------	----------

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on percentage of crop as reported by crop reporters.
[2] Average weight per measured bushel as reported by crop reporters.
[3] Preliminary.

TABLE 71.—*Oats: Receipts at primary markets, 1921–1928*

Year beginning August	Chicago	Milwaukee	Minneapolis	St. Louis	Peoria	Omaha	Total 10 markets [1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921	78,042	23,612	33,072	26,118	13,485	10,964	215,715
1922	85,169	22,780	25,706	33,261	15,947	14,886	224,104
1923	69,902	20,496	29,259	35,791	13,406	18,385	219,972
1924	74,698	20,542	54,886	34,724	11,164	16,023	261,562
1925	50,660	14,165	36,616	28,662	9,749	13,124	207,723
1926	49,420	14,857	18,170	19,746	8,256	6,636	140,031
1927	53,609	10,506	27,313	19,394	8,906	8,858	155,307
1928 [2]	40,354	7,534	20,827	24,427	7,305	6,832	138,058

Bureau of Agricultural Economics. Compiled from reports of Chicago Board of Trade, Duluth Board of Trade, Indianapolis Board of Trade, Kansas City Board of Trade, Omaha Grain Exchange, St. Louis Merchants Exchange, Milwaukee Chamber of Commerce, Minneapolis Chamber of Commerce, and American Elevator and Grain Trade.

[1] Includes also Duluth, Toledo, Kansas City, and Indianapolis.
[2] Beginning January, 1929, figures are subject to revision.

TABLE 72.—*Oats: Classification of receipts graded by licensed inspectors, all inspection plants, 1919–1928*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE

Year and class	Receipts of—					
	No. 1	No. 2	No. 3	No. 4	Sample grade	Total
Year beginning August—	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1919	5,652	51,006	94,497	15,805	3,537	170,497
1920	8,803	60,169	73,072	14,766	6,831	163,641
1921	2,519	31,643	105,103	31,774	6,664	177,703
1922	2,548	47,348	95,984	17,004	4,640	167,524
1923	2,724	41,530	90,759	22,643	11,307	168,963
1924	1,489	33,631	110,377	24,580	14,853	184,930
1925	2,197	53,587	75,634	17,989	6,260	155,667
1926	1,465	19,692	49,581	28,548	17,695	116,981
1927	2,838	29,106	64,444	19,397	5,728	121,513
1928	4,408	14,144	77,823	20,684	9,305	126,364

Bureau of Agricultural Economics.

TABLE 73.—*Oats: Visible supply in United States,*[1] *1909–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	3, 800	5, 183	12, 799	13, 264	13, 586	11, 180	8, 759	8, 639	9, 916	9, 223	6, 905	4, 245
1910	2, 761	12, 551	18, 802	17, 022	15, 505	16, 129	15, 997	15, 769	13, 129	10, 559	8, 125	9, 570
1911	11, 203	20, 742	21, 044	22, 600	20, 315	18, 754	15, 431	14, 366	13, 429	11, 991	8, 052	3, 690
1912	1, 031	4, 160	9, 260	10, 552	10, 774	8, 457	9, 646	12, 343	13, 115	8, 704	8, 105	14, 756
1913	17, 131	24, 662	30, 718	31, 684	29, 664	26, 909	24, 450	21, 489	19, 755	13, 262	8, 144	7, 210
1914	6, 482	20, 124	27, 285	31, 866	32, 471	32, 956	33, 173	33, 258	27, 284	23, 022	12, 623	4, 345
1915	1, 309	2, 924	14, 381	15, 730	20, 928	21, 081	20, 175	20, 265	17, 892	12, 096	16, 192	12, 452
1916	8, 537	27, 691	38, 866	45, 580	47, 467	48, 823	42, 675	36, 740	34, 191	28, 933	17, 454	9, 741
1917	6, 679	7, 277	14, 165	17, 453	18, 595	17, 657	13, 879	13, 947	18, 098	21, 911	20, 822	13, 227
1918	7, 876	19, 309	24, 689	22, 050	29, 143	34, 828	30, 505	27, 666	22, 882	21, 507	15, 827	18, 094
1919	20, 481	19, 411	19, 552	19, 196	16, 922	13, 080	11, 550	10, 401	9, 576	6, 813	8, 642	3, 623
1920	3, 786	8, 149	27, 602	34, 414	33, 961	32, 194	33, 632	34, 142	33, 903	30, 740	28, 426	34, 401
1921	37, 562	60, 455	65, 843	69, 998	69, 198	67, 728	68, 010	68, 529	64, 644	55, 837	47, 950	42, 743
1922	36, 667	38, 355	35, 968	34, 077	32, 940	32, 391	30, 861	27, 683	24, 044	21, 932	13, 514	8, 523
1923	5, 477	10, 111	16, 514	20, 488	18, 686	19, 940	17, 539	17, 741	16, 715	10, 656	6, 720	5, 264
1924	3, 086	11, 403	52, 715	66, 564	67, 265	72, 128	73, 570	72, 386	61, 104	48, 082	35, 331	33, 263
1925	26, 298	50, 706	65, 818	64, 926	64, 251	63, 187	63, 076	58, 974	52, 023	47, 025	38, 976	37, 900
1926	33, 772	43, 671	48, 450	48, 097	48, 288	44, 927	45, 422	43, 454	37, 145	29, 573	20, 502	17, 790
1927	12, 001	21, 501	24, 931	23, 857	23, 252	21, 907	20, 350	19, 791	15, 746	11, 168	7, 086	3, 225
1928	2, 377	13, 376	15, 193	14, 472	13, 295	13, 968	13, 611	14, 898	12, 609	10, 276	9, 280	7, 430
1929	7, 626	23, 488	26, 321	30, 155	27, 534							

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin.

[1] Saturday nearest the 1st of each month.

TABLE 74. *Oats: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC OATS IN UNITED STATES [1]

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27						47, 123	47, 421	45, 105	38, 481	30, 513	22, 553	17, 686
1927–28	11, 886	23, 224	26, 513	25, 682	24, 784	23, 815	20, 006	21, 127	16, 803	11, 667	7, 171	3, 338
1928–29	1, 939	15, 992	17, 561	16, 900	15, 399	17, 314	16, 219	16, 800	14, 003	11, 493	10, 591	8, 592
1929–30	8, 668	24, 318	28, 597	32, 762	30, 064							

UNITED STATES OATS IN CANADA

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1926–27						352	247	218	164	635	1, 432	1, 759
1927–28	1, 253	1, 238	1, 435	1, 110	825	670	563	438	216	57	239	60
1928–29	4	978	2, 326	1, 031	547	644	494	424	309	716	529	346
1929–30	334	2, 177	4, 711	4, 435	4, 410							

CANADIAN OATS IN UNITED STATES [2]

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1926–27						228	228	171	66	117	321	19
1927–28	24	26	0	139	296	609	312	247	117	21	199	122
1928–29	101	123	141	211	711	900	704	801	516	722	577	377
1929–30	341	341	283	426	670							

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay, and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes oats in store in public and private elevators in 39 important markets and also the oats afloat in vessels or barges in the harbors of lake and seaboard ports. Oats in transit either by rail or water, mill stocks, or small private stocks of oats intended only for local purposes, not included.

[2] Includes oats stored at lake and seaboard ports, exclusive of oats in transit on lakes and canals.

TABLE 75.—*Oats, including oatmeal: International trade, average 1910–1914, annual 1926–1929*

Country	Year ended June 30									
	Average 1910–1914		1926		1927		1928		1929 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Argentina	[1] 55	[1] 42, 569	92	32, 006	102	39, 691	80	28, 831	-------	-------
Canada	84	15, 245	2, 246	35, 951	2, 051	13, 381	2, 770	10, 194	3, 452	19, 927
United States	5, 352	9, 655	185	39, 686	99	15, 041	202	9, 823	398	16, 302
Rumania	[2] [3] 72	[2] [3] 10, 493	1	1, 352	0	[4] 6, 634	-------	-------	-------	-------
Russia	[2] 1, 206	[2] 70, 466	0	1, 354	0	-------	-------	-------	-------	-------
Algeria	[2] 79	[2] 4, 102	68	2, 595	1, 560	102	498	1, 565	-------	-------
Chile	[1] 2	[1] 2, 469	0	4, 093	0	6, 087	0	4, 021	-------	-------
Czechoslovakia	0	0	4, 747	44	323	3, 595	530	5, 862	300	4, 453
Hungary	[2] 1, 420	[2] 12, 416	7	3, 606	0	2, 381	1	1, 199	1	790
Irish Free State	0	0	2, 862	3, 485	1, 824	2, 756	560	5, 740	1, 043	2, 335
Tunis	[2] 2	[3] 2, 875	28	1, 462	92	1, 047	283	414	-------	-------
Yugoslavia [5]	0	0	0	962	0	666	25	493	71	325
Australia	[1] 898	[1] 270	343	133	260	205	-------	-------	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	68, 371	[1] 1, 591	36, 897	1, 136	24, 911	2, 024	31, 309	713	26, 003	1, 020
Germany	37, 202	33, 575	28, 204	5, 334	19, 255	7, 923	16, 522	13, 311	9, 961	25, 835
Switzerland	[2] 12, 464	[2] 13	10, 662	4	9, 895	4	9, 770	4	10, 741	5
Belgium	8, 420	62	9, 618	25	6, 576	120	6, 607	30	9, 354	15
France	29, 846	122	14, 110	388	3, 309	488	2, 489	1, 735	7, 276	394
Italy	8, 158	65	7, 743	42	7, 723	0	9, 064	1	5, 429	1
Netherlands	[2] 38, 862	[2] 30, 771	7, 477	287	6, 452	167	6, 938	260	6, 486	773
Austria	[2] 2, 295	[2] 114	4, 877	11	5, 819	12	5, 303	12	-------	-------
Sweden	[2] 6, 468	[2] 1, 899	2, 908	329	1, 631	2, 429	2, 215	536	4, 172	720
Finland	[6] 1, 150	[6] 356	1, 529	17	1, 279	4	990	92	3, 503	13
Poland	0	0	1, 283	5, 926	2, 870	1, 048	1, 619	659	1, 461	267
Denmark	[2] 4, 720	[2] 152	842	411	1, 922	164	2, 155	123	2, 615	326
Norway	[2] [7] 497	[2] [7] 27	1, 413	11	582	6	683	5	336	9
Cuba	1, 291	0	1, 502	0	1, 321	0	1, 051	0	-------	-------
Estonia	0	0	669	0	354	0	622	0	1, 318	0
Latvia [2]	0	0	513	27	705	6	-------	-------	-------	-------
Japan [2]	5	42	153	0	144	0	7	0	-------	-------
Greece	0	0	-------	0	423	0	200	0	107	0
Union of South Africa	[1] 366	[1] 434	231	125	191	69	126	78	-------	-------
Total, 32 countries	229, 285	239, 783	141, 210	141, 002	101, 673	106, 050	102, 619	85, 701	94, 027	73, 510

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] Average of calendar years, 1909–1913 from original source.
[2] Year ended July 31, International Yearbook of Agricultural Statistics.
[3] Average for the season 1911–12 to 1913–14.
[4] International Crop Report and Agricultural Statistics.
[5] Year ended Dec. 31.
[6] Average for calendar years 1909–1913. International Yearbook of Agricultural Statistics.
[7] Season 1913–14.

TABLE 76.—*Oats: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	46.2	41.6	41.0	40.6	41.5	43.9	45.5	45.8	44.4	43.2	42.6	41.9	43.2
1910	40.0	37.3	35.6	34.6	33.8	33.2	33.0	32.6	32.8	34.0	36.1	38.8	36.2
1911	40.3	41.4	43.2	44.4	45.0	46.3	48.6	50.9	54.0	55.6	53.9	48.4	46.1
1912	39.6	34.3	33.6	32.8	32.0	32.3	32.8	33.1	33.6	35.1	36.8	37.6	34.9
1913	38.4	39.4	38.8	38.6	39.2	39.2	39.1	39.2	39.5	39.8	39.4	37.8	38.9
1914	39.5	42.8	43.1	43.4	44.4	47.6	51.1	52.8	53.4	52.4	49.0	46.0	44.9
1915	42.0	36.5	34.7	35.5	37.6	41.8	43.6	42.4	42.3	42.4	41.2	40.2	39.3
1916	41.6	43.8	46.8	50.7	51.9	53.3	56.0	59.2	66.2	70.4	69.4	71.3	51.4
1917	67.7	62.9	62.0	64.2	70.2	76.3	82.4	87.6	87.4	82.0	77.2	74.6	72.1
1918	71.6	70.3	69.6	69.6	70.8	67.6	63.4	64.2	68.4	71.0	71.0	73.1	70.1
1919	73.5	70.0	68.6	69.6	74.3	80.4	83.6	87.6	94.5	100.6	103.7	93.2	80.3
1920	76.0	65.4	57.6	50.2	45.8	43.7	41.8	40.6	38.0	37.4	36.8	34.7	51.1
1921	32.0	30.6	30.1	29.7	30.6	31.9	34.7	36.6	37.2	38.2	37.8	36.2	33.4
1922	33.6	33.4	36.4	38.8	40.3	41.5	42.4	43.5	44.8	45.3	43.7	40.2	39.0
1923	37.6	38.0	39.4	40.8	42.6	43.4	45.4	46.2	46.5	46.3	46.8	49.4	42.6
1924	49.1	47.1	48.9	47.4	50.6	54.0	53.4	49.7	44.7	45.4	48.3	45.3	48.3
1925	40.7	38.1	37.2	37.6	39.1	40.0	39.2	38.8	39.4	39.5	38.9	37.7	39.0
1926	37.9	35.6	39.0	39.8	41.1	42.6	43.4	43.4	43.2	45.4	48.0	46.3	41.2
1927	44.4	43.9	44.6	45.1	48.1	49.3	51.3	54.5	56.9	62.0	61.4	56.2	48.9
1928	38.4	36.7	39.0	39.8	42.5	43.7	47.0	46.6	45.8	44.6	42.5	42.9	41.6
1929	42.7	44.1	44.8	43.1	43.6	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of oats for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 77.—*Oats, No. 3, white: Weighted average price*[1] *per bushel of reported cash sales, Chicago, 1909–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec	Jan.	Feb.	Mar.	Apr.	May	June	July	Weighted average[1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	38	39	40	40	44	48	47	44	42	40	38	41	42
1910	35	34	32	32	32	33	31	31	32	34	39	44	33
1911	41	45	47	48	47	50	52	53	57	55	53	49	50
1912	33	33	33	32	33	33	33	32	35	38	40	40	35
1913	42	43	40	40	40	39	39	39	39	40	40	37	40
1914	42	48	46	48	49	53	58	57	57	54	49	53	50
1915	41	34	36	36	42	48	45	42	44	43	39	41	41
1916	44	46	49	55	53	57	56	61	69	70	67	78	54
1917	61	60	60	65	77	82	89	93	89	77	77	77	71
1918	70	72	69	72	72	65	58	63	70	69	70	78	70
1919	73	68	70	73	82	86	86	98	101	109	113	91	80
1920	70	62	54	51	48	44	42	42	36	39	37	34	51
1921	32	35	31	33	34	34	36	36	38	38	37	36	35
1922	32	38	42	43	44	43	44	45	46	45	43	40	41
1923	38	40	43	43	44	46	48	47	48	48	51	54	45
1924	50	48	50	50	58	58	58	48	42	45	49	44	50
1925	41	39	39	40	42	42	41	40	42	41	40	42	41
1926	38	38	44	42	46	46	43	44	45	50	49	45	43
1927	47	47	48	49	54	55	56	59	63	67	68	56	55
1928	38	41	42	44	46	50	50	48	48	45	45	47	44
1929	43	48	47	45	45	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from the Chicago Daily Trade Bulletin. Data for 1899–1908 available in 1924 Yearbook, p. 628, Table 94.

[1] Average of daily prices weighted by car-lot sales.

TABLE 78.—*Barley: Acreage, production, value, exports, etc., United States, 1900–1929*

Year	Acreage harvested	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel at Chicago, year beginning August[1]	Foreign trade, including barley, flour, and malt, year beginning July 1[2]			
							Domestic exports	Imports	Net exports[3]	
									Total	Percentage of production
	1,000 acres	*Bushels of 48 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*
1900	4,545	21.1	96,041	40.5	38,896	[4] 56	6,619	175	6,445	6.7
1901	4,742	25.7	121,784	45.2	55,068	64	9,079	60	9,019	7.4
1902	5,126	29.1	149,389	45.5	67,944	56	8,745	59	8,686	5.8
1903	5,568	26.4	146,864	45.4	66,700	56	11,280	94	11,187	7.6
1904	5,912	27.4	162,105	41.6	67,427	49	11,105	84	11,021	6.8
1905	6,250	27.2	170,089	39.4	66,959	50	18,431	20	18,410	10.8
1906	6,730	28.6	192,270	41.6	80,069	61	8,616	41	8,632	4.5
1907	6,941	24.5	170,008	66.3	112,675	84	4,554	202	4,370	2.6
1908	7,294	25.3	184,857	55.2	102,037	67	6,729	4	6,725	3.6
1909	*7,699*	*22.5*	*173,344*							
1909	7,699	24.4	187,973	54.8	102,947	67	4,454	5	4,449	2.4
1910	7,743	22.5	173,832	57.8	100,426	92	9,507	187	9,320	5.4
1911	7,627	21.0	160,240	86.9	139,182	122	1,655	2,772	[5] 1,117	.7
1912	7,530	29.7	223,824	50.5	112,957	68	17,874	15	17,859	8.0
1913	7,499	23.8	178,189	53.7	95,731	65	6,945	351	6,594	3.7
1914	7,565	25.8	194,953	54.8	105,903	72	28,712	103	28,609	14.7
1915	7,148	32.0	228,851	51.6	118,172	69	30,821	37	30,783	13.5
1916	7,757	23.5	182,309	88.1	160,646	191	20,319	462	19,857	10.9
1917	8,933	23.7	211,759	113.7	240,758	146	28,717	517	28,200	13.3
1918	9,740	26.3	256,225	91.7	234,942	104	29,324	24	29,301	11.4
1919	*6,473*	*18.9*	*122,025*							
1919	6,720	22.0	147,608	120.6	178,080	145	34,691	335	34,356	23.3
1920	7,600	24.9	189,332	71.3	135,083	78	27,255	20	27,234	14.4
1921	7,414	20.9	154,946	41.9	64,934	61	27,546	8	27,538	17.8
1922	7,317	24.9	182,068	52.5	95,560	65	21,909	38	21,871	12.0
1923	7,835	25.2	197,691	54.1	107,038	72	13,913	55	13,858	7.0
1924	*6,767*	*23.5*	*159,139*							
1924	6,925	26.2	181,575	74.1	134,590	90	28,543	48	28,495	15.7
1925	7,997	26.7	213,863	58.8	125,709	72	30,448	53	30,395	14.2
1926	7,970	23.2	184,905	57.5	106,237	77	19,655	49	19,605	10.6
1927	9,476	28.1	265,882	67.8	180,200	91	39,274	45	39,230	14.8
1928	12,598	28.4	357,487	55.2	197,459	60	60,295	45	60,249	16.9
1929 [6]	13,212	23.2	307,105	55.0	168,807					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 799, for data for earlier years.

[1] From Bureau of Labor Statistics as follows: Bulletin No. 39, 1900–1901. August, 1900–December, 1901, choice to fancy malting, by samples. Wholesale price bulletins—monthly quotations, January, 1902–December, 1913, choice to fancy malting; January, 1914–September, 1927, fair to good malting. Beginning October, 1927, grade reported as feeding, but as grade remained unchanged, no change was made in comparative prices.

[2] Compiled from Commerce and Navigation of the United States 1900–1917: Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues; 1919–1926; January and June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce. Malt converted to terms of barley on the basis that 1.1 bushels of malt is the product of 1 bushel of barley. Barley flour converted on the basis that 1 barrel of flour is the product of 9 bushels of barley. Exports of flour not reported prior to 1919. Barley—general imports, 1900–1909; imports for consumption, 1910–1929. Malt—general imports, 1900–1914; imports for consumption, 1915–1929. Imports of flour not reported prior to 1915; imports for consumption, 1915–1929.

[3] Total exports (domestic exports plus reexports) minus total imports.

[4] Average for 11 months.

[5] Net imports. Total imports minus total exports (domestic plus foreign).

[6] Preliminary.

TABLE 79.—*Barley: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage harvested					Production				
	Average, 1923–1927	1926	1927	1928	1929 [1]	Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	4	4	4	4	4	106	120	108	112	124
Vermont	6	6	6	6	7	192	180	174	150	210
New York	170	179	188	169	159	4, 859	5, 066	5, 452	4, 648	3, 514
New Jersey	[2] 1	1	2	2	3	[2] 41	33	74	60	66
Pennsylvania	15	18	21	29	36	404	486	588	783	882
North Atlantic	196	208	221	210	209	5, 599	5, 885	6, 396	5, 753	4, 796
Ohio	102	116	155	333	103	2, 969	3, 712	4, 185	9, 191	2, 420
Indiana	28	23	35	78	31	663	575	833	1, 794	682
Illinois	292	302	453	680	456	8, 958	9, 362	13, 364	20, 060	12, 084
Michigan	143	133	186	270	243	3, 844	3, 790	5, 301	8, 100	5, 589
Wisconsin	492	521	620	725	703	16, 419	17, 974	21, 390	26, 898	22, 848
Minnesota	1, 148	1, 307	1, 460	2, 000	2, 200	32, 549	32, 675	43, 800	60, 000	59, 400
Iowa	238	268	454	802	642	7, 325	8, 174	14, 256	26, 466	19, 581
Missouri	6	9	7	13	14	165	216	161	286	238
North Dakota	1, 517	1, 472	1, 663	2, 179	2, 550	32, 494	21, 050	42, 406	55, 564	36, 210
South Dakota	915	778	1, 200	1, 680	2, 016	21, 801	7, 858	36, 000	36, 456	37, 296
Nebraska	259	227	246	430	647	6, 741	4, 699	7, 577	14, 018	18, 892
Kansas	494	266	452	633	608	8, 539	3, 032	5, 695	17, 661	12, 464
North Central	5, 633	5, 422	6, 931	9, 823	10, 213	142, 466	113, 117	194, 968	276, 494	227, 704
Maryland	9	10	9	13	16	306	343	274	416	512
Virginia	14	14	13	14	18	373	434	338	406	504
North Carolina	[2] 13	15	20	32	40	[2] 315	390	480	736	960
South Atlantic	33	39	42	59	74	931	1, 167	1, 092	1, 558	1, 976
Kentucky	6	7	6	2	7	172	231	162	50	206
Tennessee	28	40	42	21	24	659	1, 200	798	420	480
Oklahoma	122	110	36	54	57	2, 595	2, 970	594	1, 188	1, 425
Texas	152	174	195	156	203	3, 357	6, 090	3, 120	3, 276	5, 075
South Central	308	331	279	233	291	6, 783	10, 491	4, 674	4, 934	7, 186
Montana	137	150	195	209	251	3, 609	3, 600	6, 435	6, 374	4, 016
Idaho	115	112	129	144	147	4, 587	4, 144	5, 676	6, 192	5, 733
Wyoming	38	42	59	95	124	1, 216	1, 386	2, 006	2, 660	3, 348
Colorado	365	380	410	547	651	7, 790	6, 080	9, 020	13, 128	13, 671
New Mexico	8	8	8	12	13	147	208	144	228	325
Arizona	24	25	20	17	18	827	875	700	646	630
Utah	21	20	30	34	39	855	800	1, 410	1, 666	1, 560
Nevada	7	7	9	11	11	287	280	405	385	363
Washington	74	64	58	55	63	2, 634	2, 176	2, 436	1, 952	2, 142
Oregon	84	82	91	105	116	2, 632	2, 296	3, 185	3, 675	4, 292
California	997	1, 080	994	1, 044	992	28, 422	32, 400	27, 335	31, 842	29, 363
Far Western	1, 869	1, 970	2, 003	2, 273	2, 425	53, 005	54, 245	58, 752	68, 748	65, 443
United States	8, 041	7, 970	9, 476	12, 598	13, 212	208, 783	184, 905	265, 882	357, 487	307, 105

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[1] Preliminary.
[2] 4-year average.

TABLE 80.—*Barley: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State and division	Yield per acre							Estimated price per bushel						
	Average, 1918–1927	1924	1925	1926	1927	1928	1929	Average, 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	28.1	26.0	35.0	30.0	27.0	28.0	31.0	95	108	80	92	94	110	100
Vermont	28.9	31.0	32.0	30.0	29.0	25.0	30.0	92	103	83	85	95	110	90
New York	27.3	30.6	29.0	28.3	29.0	27.5	22.1	80	91	77	75	80	78	84
New Jersey	[1] 31.5	29.0	27.0	33.0	37.0	30.0	22.0	[1] 87	92	88	85	83	86	85
Pennsylvania	25.3	26.5	25.5	27.0	28.0	27.0	24.5	82	90	86	80	83	84	90
North Atlantic	27.2	30.2	28.9	28.3	28.9	27.4	22.9	80.6	91.6	78.0	76.1	81.0	80.4	85.8
Ohio	27.3	28.0	31.0	32.0	27.0	27.6	23.5	70	85	70	62	72	60	61
Indiana	24.4	24.0	23.0	25.0	23.8	23.0	22.0	70	77	71	66	73	59	62
Illinois	30.4	32.0	33.0	31.0	29.5	29.5	26.5	65	75	63	58	73	53	56
Michigan	25.1	29.3	24.5	28.5	28.5	30.0	23.0	71	80	72	65	76	70	69
Wisconsin	31.5	32.0	36.8	34.5	34.5	37.1	32.5	69	78	66	65	75	65	65
Minnesota	26.4	32.0	30.0	25.0	30.0	30.0	27.0	56	69	52	51	65	50	48
Iowa	28.9	31.0	31.3	30.5	31.4	33.0	30.5	60	70	57	56	66	54	52
Missouri	25.8	25.0	31.0	24.0	23.0	22.0	17.0	86	82	95	80	95	80	80
North Dakota	19.8	26.0	22.5	14.3	25.5	25.5	14.2	50	62	43	46	59	43	42
South Dakota	23.2	27.0	26.0	10.1	30.0	21.7	18.5	52	64	47	52	58	48	45
Nebraska	24.3	25.0	24.3	20.7	30.8	32.6	29.2	55	63	54	58	55	51	50
Kansas	17.8	16.5	16.0	11.4	12.6	27.9	20.5	58	65	58	61	55	50	50
North Central	23.5	27.4	26.4	20.9	28.1	28.1	22.3	57.1	67.4	52.6	54.8	63.9	51.4	50.0
Maryland	31.9	35.0	33.0	34.3	30.5	32.0	32.0	85	93	87	80	87	85	82
Virginia	26.6	27.0	26.0	31.0	26.0	29.0	28.0	92	105	97	90	87	85	96
North Carolina	[1] 24.0	23.0	23.0	26.0	24.0	23.0	24.0	[1] 110	110	120	100	110	120	128
South Atlantic	27.8	28.8	27.4	29.9	26.0	26.4	26.7	93.4	100.9	98.4	90.4	97.1	101.5	107.9
Kentucky	27.0	24.0	26.0	33.0	27.0	25.0	29.5	91	101	95	86	91	91	99
Tennessee	22.4	20.0	23.0	30.0	19.0	20.0	20.0	103	110	110	96	100	110	102
Oklahoma	21.2	23.0	14.0	27.0	16.5	22.0	25.0	68	70	75	58	65	65	63
Texas	22.5	25.0	7.2	35.0	16.0	21.0	25.0	71	76	90	53	70	73	62
South Central	22.4	23.7	12.1	31.7	16.8	21.2	24.7	73.3	74.7	85.2	60.1	75.2	74.4	65.9
Montana	22.0	25.0	21.0	24.0	33.0	30.5	16.0	63	69	72	64	60	56	68
Idaho	35.4	31.0	44.0	37.0	44.0	43.0	39.0	65	82	56	60	68	63	66
Wyoming	30.4	29.0	33.0	33.0	34.0	28.0	27.0	64	72	61	62	61	61	64
Colorado	21.0	20.0	21.0	16.0	22.0	24.0	21.0	59	72	58	55	56	54	54
New Mexico	20.9	15.0	17.0	26.0	18.0	19.0	25.0	72	60	85	65	70	75	81
Arizona	33.8	30.0	35.0	35.0	35.0	38.0	35.0	89	88	100	85	75	80	85
Utah	35.5	28.5	43.0	40.0	47.0	49.0	40.0	78	87	85	72	76	73	78
Nevada	34.9	39.5	48.0	40.0	45.0	35.0	33.0	88	110	82	85	80	80	85
Washington	32.0	22.6	34.0	34.0	42.0	35.5	34.0	71	85	68	65	77	70	78
Oregon	29.2	22.0	33.0	28.0	35.0	35.0	37.0	76	100	73	65	77	72	77
California	27.2	21.9	31.0	30.0	27.5	30.5	29.6	82	116	75	58	93	72	70
Far Western	27.0	22.8	29.5	27.5	29.3	30.2	27.0	74.0	96.6	70.3	59.7	77.9	65.9	67.1
United States	24.8	26.2	26.7	23.2	28.1	28.4	23.2	62.5	74.1	58.8	57.5	67.8	55.2	55.0

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 4-year average.

TABLE 81.—*Barley: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual, 1927–1929*

Country	Acreage: Average, 1909–1913 [1]	Acreage: Average, 1921–1925	Acreage: 1927	Acreage: 1928	Acreage: 1929, preliminary	Yield per acre: Average 1909–1913 [1]	Yield per acre: Average, 1921–1925	Yield per acre: 1927	Yield per acre: 1928	Yield per acre: 1929, preliminary	Production: Average, 1909–1913 [1]	Production: Average, 1921–1925	Production: 1927	Production: 1928	Production: 1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	1,574	3,022	3,506	4,881	5,926	28.8	25.4	27.6	27.9	17.5	45,275	76,899	96,938	136,391	102,313
United States	7,620	7,498	9,476	12,598	13,212	24.3	24.8	28.1	28.4	23.2	184,812	186,029	265,882	357,487	307,105
Total	9,194	10,520	12,982	17,479	19,138	25.0	25.0	27.9	28.3	21.4	230,087	262,928	362,820	493,878	409,418
EUROPE															
England and Wales	1,488	1,352	1,049	1,185	1,120	34.0	34.2	38.3	40.1	41.6	50,658	46,274	40,227	47,549	46,552
Scotland	191	158	117	112	101	37.6	38.6	37.5	42.9	46.7	7,173	6,092	4,387	4,807	4,713
Irish Free State	162	156	121	129	118	45.5	38.7	52.0	47.6	------	7,366	6,033	6,295	6,146	------
Norway	89	137	150	149	------	32.2	32.0	31.1	34.4	------	2,867	4,383	4,672	5,133	5,398
Sweden	448	409	302	272	323	33.6	31.6	30.2	35.8	33.4	15,035	12,921	9,106	9,743	10,803
Denmark	639	695	822	877	909	42.0	46.4	43.9	57.6	55.6	26,860	32,246	36,082	50,541	50,522
Netherlands	68	63	66	70	78	48.1	52.4	50.6	64.2	46.6	3,270	3,302	3,341	4,494	3,633
Belgium	88	84	79	77	95	50.5	49.1	52.8	56.7	65.2	4,446	4,127	4,169	4,364	6,193
France	1,987	1,713	1,747	1,756	1,853	26.6	25.6	28.8	29.0	31.9	52,826	43,892	50,327	50,856	59,023
Spain	3,510	4,343	4,452	4,449	4,426	21.3	21.2	20.7	18.6	21.9	74,689	92,208	92,220	82,552	97,109
Portugal	(170)	182	193	193	------	------	11.3	10.3	7.8	------	(1,200)	2,053	1,982	1,512	2,012
Italy	647	576	583	560	571	16.4	17.9	16.2	19.7	20.8	10,638	10,283	9,443	11,024	11,875
Germany	3,464	3,198	3,678	3,754	3,835	38.6	31.3	34.2	40.9	38.1	133,787	100,182	125,770	153,721	146,089
Austria	421	320	366	387	386	23.9	22.1	29.9	33.5	30.5	10,065	7,072	10,935	12,952	11,776
Czechoslovakia	2,275	1,673	1,746	1,779	1,839	31.3	30.0	33.6	36.2	31.9	71,108	50,119	58,657	64,398	58,690
Hungary	1,322	1,096	1,002	1,028	1,134	24.5	20.3	23.6	29.8	25.9	32,369	22,198	23,684	30,671	29,381
Yugoslavia	1,058	902	966	974	1,103	19.1	15.6	15.0	18.6	17.2	20,229	14,027	14,449	18,106	18,918
Greece	[2] 369	383	465	499	469	[2] 18.8	14.8	15.6	14.5	10.0	[2] 6,953	5,676	7,271	7,246	4,697
Bulgaria	516	539	561	601	551	20.1	17.2	22.9	26.0	22.0	10,380	9,266	12,867	15,621	12,148
Rumania	[3] 3,378	4,315	4,359	4,322	5,074	[3] 18.3	12.8	13.3	16.1	24.8	[3] 61,677	55,295	57,950	69,401	125,717
Poland	3,048	2,547	2,761	2,856	2,863	22.7	19.6	21.2	24.6	22.0	69,655	49,850	58,602	70,143	62,925
Lithuania	536	451	487	418	529	16.5	20.5	17.7	16.5	22.6	8,820	9,234	8,630	6,910	11,953
Latvia	463	414	458	362	451	17.1	16.9	13.0	9.0	21.8	7,922	6,979	5,974	3,275	9,810
Estonia	329	307	295	263	281	18.8	17.8	14.7	16.0	20.1	6,201	5,464	4,335	4,211	5,654
Finland	278	273	267	272	269	17.8	21.2	24.6	21.2	23.3	4,947	5,782	6,571	5,767	6,279
Russia, European and Asiatic	26,193	14,728	16,837	17,213	19,027	16.0	12.7	12.0	14.2	------	418,030	186,663	202,440	245,013	------
Total Europe reporting area and production all years	26,523	25,811	26,628	26,873	28,260	26.0	23.0	24.2	27.1	28.1	689,108	592,549	644,977	728,652	794,460
Estimated European total excluding Russia	27,000	26,300	27,100	27,400	28,800	------	------	------	------	------	[4] 701,000	606,000	659,000	743,000	809,000

AFRICA															
Morocco	(3,000)	2,862	2,469	2,965	3,006	......	14.1	13.9	16.6	12.8	(38,000)	40,204	34,231	48,232	38,388
Algeria	3,395	3,017	3,360	3,411	3,412	13.5	10.2	10.3	11.6	12.0	45,974	30,779	34,554	39,716	40,957
Tunis	1,228	1,022	856	1,455	1,236	6.4	6.7	4.8	8.7	9.3	7,826	6,843	4,137	12,631	11,483
Egypt	398	381	376	366	401	29.8	30.0	31.8	29.5	31.6	11,867	11,427	11,961	10,798	12,669
Total	8,021	7,282	7,061	8,137	8,055	12.9	12.3	12.0	13.7	12.8	103,667	89,353	84,883	111,377	103,497
ASIA															
India	8,877	6,976	6,387	6,825	......	16.4	19.2	18.6	14.3	......	145,496	133,793	119,047	97,720	......
Syria and Lebanon	(450)	[3] 682	655	892	750	......	10.7	23.4	15.4	32.1	(5,000)	7,300	15,325	13,706	24,042
Japan	3,042	2,630	2,343	2,242	2,202	31.5	31.4	35.2	36.3	36.5	95,784	82,490	82,482	81,477	80,360
Chosen	1,623	2,139	2,190	2,209	2,294	19.9	17.1	16.1	15.5	16.4	32,243	36,607	35,312	34,157	37,616
Total Northern Hemisphere countries reporting area and production all years	48,853	49,064	51,859	57,832	60,699	23.7	21.8	23.6	25.3	23.9	1,155,889	1,071,227	1,225,799	1,463,247	1,449,393
Estimated Northern Hemisphere total excluding Russia and China	64,200	62,300	62,800	68,800	71,600	......	......	......	......	......	[4] 1,407,000	1,321,000	1,435,000	1,671,000	1,659,000
SOUTHERN HEMISPHERE															
Chile	111	160	168	194	......	36.8	33.4	40.3	29.7	......	4,090	5,347	6,765	5,766	......
Argentina	230	726	1,186	1,321	1,475	[3] 19.1	13.7	12.3	12.7	11.4	[3] 4,395	9,924	14,560	16,810	16,810
Union of South Africa [5]	[2] 109	99	58	85	75	[2] 11.7	11.8	13.9	11.7	23.1	[2] 1,274	1,172	808	994	1,731
Australia	154	307	322	......	......	19.6	19.7	16.0	......	......	3,021	6,048	5,167	......	......
Estimated Southern Hemisphere total	800	1,500	2,400	2,100	2,300	......	......	......	......	......	18,000	31,000	43,000	46,000	......
Total Northern and Southern Hemisphere countries, reporting area and production all years	49,192	49,889	53,103	59,238	62,249	23.6	21.7	23.4	25.0	23.6	1,161,558	1,082,323	1,241,167	1,481,051	1,467,934
Estimated world total excluding Russia and China	65,000	63,800	65,200	70,900	73,900	......	......	......	......	......	[4] 1,425,000	1,352,000	1,478,000	1,717,000	......

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Estimates given are for crops harvested during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes in boundary have occurred, averages are estimated for territory within present boundaries.
[2] 1 year only.
[3] 4-year average.
[4] The estimate for the 5-year period, 1909–1913, given in this table is somewhat larger than the figure obtained by averaging the same 5 years in Table 82. This is because in this table estimates for warring countries are for postwar boundaries, whereas in Table 82 they are for pre-war territory. As a result, in excluding Russia, which lost territory during the war, a smaller area is excluded in this table than in Table 82.
[5] Excludes native locations which produced 38,550 bushels in 1917–18 and 29,056 bushels in 1920–21.

TABLE 82.—*Barley: World production, 1894–1929*

Year	Estimated world production excluding Russia	Estimated European production excluding Russia	Selected countries							
			United States	Russia [1]	Germany	Japan	Canada	India	Spain	Rumania
	1,000,000 bushels	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*	*1,000,000 bushels*
1894	935	544	78	277	131	81	----------	----------	57	17
1895	1,008	527	115	226	128	80	----------	----------	47	22
1896	973	528	99	254	125	71	----------	----------	36	32
1897	907	481	103	239	118	73	----------	----------	46	21
1898	1,040	564	100	307	130	83	----------	----------	73	30
1899	1,017	533	117	227	137	77	----------	----------	54	5
1900	1,269	522	96	237	138	82	----------	----------	57	15
1901	1,085	570	122	240	153	83	----------	----------	80	24
1902	1,127	592	149	338	142	74	----------	----------	81	25
1903	1,099	589	147	357	153	60	----------	----------	64	30
1904	1,068	512	162	346	135	81	----------	----------	54	12
1905	1,067	532	170	347	134	77	----------	----------	46	26
1906	1,226	610	192	331	143	84	----------	----------	90	34
1907	1,161	569	170	377	161	90	----------	----------	54	20
1908	1,132	536	185	402	141	87	47	----------	70	13
1909	1,338	621	188	502	161	87	55	----------	79	20
1910	1,242	560	174	488	133	82	29	----------	76	29
1911	1,326	606	160	437	145	86	44	----------	87	26
1912	1,345	589	224	496	160	91	49	----------	60	21
1913	1,400	637	178	600	169	101	48	----------	69	27
1914	1,213	546	195	[2] 433	144	86	36	125	72	26
1915	1,244	477	229	[3] 429	114	95	54	143	84	29
1916	1,201	507	182	[4] 305	128	89	43	148	87	30
1917	1,170	427	212	325	[5] 90	89	55	156	78	----------
1918	1,277	424	256	----------	94	89	77	156	90	[5] 5
1919	1,120	483	148	----------	88	95	56	130	82	32
1920	1,252	555	189	216	82	92	63	150	90	68
1921	1,240	555	155	118	89	88	60	117	89	44
1922	1,306	588	182	176	74	87	72	146	78	94
1923	1,416	649	198	196	108	71	77	145	112	61
1924	1,312	566	182	181	110	[6] 75	89	137	84	31
1925	1,486	672	214	262	119	91	87	123	99	47
1926	1,442	674	185	241	113	88	100	121	96	77
1927	1,478	659	266	202	126	82	97	119	92	58
1928	1,717	743	357	245	154	81	136	98	83	69
1929 [7]	----------	809	307	----------	146	80	102	----------	97	126

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. For each year is shown the production during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Includes all Russian territory reporting for the years shown.
[2] Total Russian Empire exclusive of the 10 Vistula Provinces of Russian Poland and the Province of Batum in Transcaucasia.
[3] Exclusive of Russian Poland, Lithuania, parts of present Latvia and the Ukraine, and two Provinces of Transcaucasia.
[4] Beginning this year estimates within present boundaries of the Union of Socialist Soviet Republics excluding Turkestan, Transcaucasia, and the Far East, which regions in 1924 produced 20,897,000 bushels.
[5] Postwar boundaries beginning this year and therefore not comparable with earlier years.
[6] Beginning this year weighed bushels, those reported for the earlier years being measured bushels.
[7] Preliminary.

TABLE 83.—*Barley: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	2.2	15.0	23.4	16.5	8.5	8.6	6.5	7.5	6.1	2.9	1.8	1.0	100.0
1918	1.9	9.8	13.6	10.5	7.9	7.8	8.1	5.4	7.2	9.0	11.6	7.2	100.0
1919	18.5	19.2	14.3	9.9	6.4	7.5	5.4	3.1	3.7	3.4	3.0	5.6	100.0
1920	7.0	16.5	15.0	9.9	9.9	7.2	6.7	5.5	6.5	4.2	5.7	5.9	100.0
1921	35.0	14.0	10.5	7.8	4.4	4.2	3.9	4.3	4.2	3.0	4.4	4.3	100.0
1922	17.4	22.9	14.6	10.8	5.2	6.0	4.8	3.2	3.5	1.9	2.7	7.0	100.0
1923	10.3	23.7	15.1	9.9	7.8	6.5	4.1	3.5	3.1	2.6	2.3	11.1	100.0
1924	9.0	16.8	21.4	17.0	8.1	5.7	5.1	3.8	3.3	2.4	2.7	4.7	100.0
1925	16.4	19.1	18.4	11.7	6.6	5.1	4.0	3.4	3.1	2.0	3.3	6.9	100.0
1926	17.4	16.5	11.6	7.4	6.2	4.8	5.1	3.2	3.9	3.6	4.1	16.2	100.0
1927	9.1	17.4	18.7	12.2	8.0	5.7	4.7	4.5	4.5	2.1	2.7	10.4	100.0
1928	12.6	21.4	18.3	11.8	6.7	6.0	3.5	3.9	3.2	2.7	2.5	7.4	100.0

Bureau of Agricultural Economics.

TABLE 84.—*Barley: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC BARLEY IN UNITED STATES [1]

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27	-------	-------	-------	-------	-------	7,097	6,664	6,116	5,339	3,675	3,046	2,720
1927–28	3,108	5,041	6,549	5,957	5,769	4,825	4,423	4,273	4,588	3,890	2,410	2,801
1928–29	3,395	9,318	10,681	11,067	11,744	10,926	11,985	11,399	9,998	8,412	7,373	6,861
1929–30	8,798	12,894	12,563	12,721	11,760	-------	-------	-------	-------	-------	-------	-------

UNITED STATES BARLEY IN CANADA

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1926–27	-------	-------	-------	-------	-------	272	300	64	70	59	0	13
1927–28	5	66	665	344	152	40	42	9	25	9	1	20
1928–29	0	767	4,171	5,599	2,319	1,144	312	173	170	81	92	659
1929–30	279	246	1,266	1,749	955	-------	-------	-------	-------	-------	-------	-------

CANADIAN BARLEY IN UNITED STATES [2]

	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1926–27	-------	-------	-------	-------	-------	2,942	2,246	1,677	608	2,401	1,573	175
1927–28	19	27	27	717	1,768	1,945	1,499	1,191	557	112	483	278
1928–29	300	249	1,751	2,959	4,778	6,210	4,731	3,232	2,259	2,523	3,315	2,110
1929–30	2,277	1,711	1,654	1,999	2,637	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes barley in store in public and private elevators in 39 important markets and also barley afloat in vessels or barges in harbors of lake and seaboard ports. Barley in transit either by rail or water, mill stocks, or small private stocks of barley intended only for local purposes, not included.
[2] Includes barley stored at lake and seaboard ports, exclusive of barley in transit on lakes and canals.

TABLE 85.—*Barley: Farm stocks, growing conditions, and shipments, United States, 1910–1929*

Year beginning August	Stocks of old barley on farms Aug. 1 [1]	Condition of new crop				Weight per measured bushel of new barley [2]	Stocks of barley on farms on Mar. 1 following [1]	Shipped out of county where grown [1]
		June 1	July 1	Aug. 1	Sept. 1			
	1,000 bushels	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*1,000 bushels*	*1,000 bushels*
1910	8,075	89 6	73.7	70.0	69.8	46.9	33,498	86,955
1911	5,763	90.2	72.1	66.2	65.5	46.0	24,754	91,620
1912	2,591	91.1	88.3	89.1	88.9	46.8	62,301	120,143
1913	11,252	87.1	76.6	74.9	73.4	46.5	44,126	86,262
1914	7,609	95.5	92.6	85.3	82.4	46.2	42,889	87,834
1915	6,336	94.6	94.1	93.8	94.2	47.4	58,301	98,965
1916	10,982	86.3	87.9	80.0	74.6	45.2	33,244	79,257
1917	3,775	89.3	85.4	77.9	76.3	46.6	44,419	84,056
1918	4,510	90.5	84.7	82.0	81.5	46.9	81,746	99,987
1919	11,897	91.7	87.4	73.6	69.2	45.2	33,820	50,471
1920	4,122	87.6	87.6	84.9	82.5	46.0	65,229	68,663
1921	13,487	87.1	81.4	71.4	68.4	44.4	42,294	55,738
1922	7,497	90.1	82.6	82.0	81.2	46.2	42,469	66,560
1923	6,805	89.0	86.1	82.6	79.5	45.3	44,930	68,190
1924	6,359	79.5	80.2	80.7	82.5	47.0	40,576	68,071
1925	5,728	83.1	81.2	79.5	80.3	45.9	52,253	80,547
1926	9,622	81.0	73.3	69.8	68.7	45.9	39,183	55,983
1927	3,754	81.5	84.2	83.3	82.9	46.8	61,972	87,975
1928	7,751	82.7	81.3	86.5	84.4	46.6	97,167	118,355
1929 [3]	17,071	83.7	76.7	70.1	68.8	45.9	----------	----------

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Based on percentages of entire crop as reported by crop reporters.
[2] Average weight per measured bushel as reported by crop reporters.
[3] Preliminary.

TABLE 86.—*Barley: Receipts at specified markets, 1921–1928*

Year beginning August	Minneapolis	Duluth	Chicago	Milwaukee	Omaha	Total 5 markets	Fort William and Port Arthur [1]
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1921	11, 926	5, 179	7, 573	9, 330	1, 152	35, 160	11, 597
1922	14, 244	3, 844	10, 103	8, 922	801	37, 914	15, 756
1923	15, 396	3, 654	9, 755	9, 077	948	38, 830	15, 910
1924	23, 158	14, 501	11, 336	13, 127	796	62, 918	28, 045
1925	23, 245	13, 244	9, 540	10, 673	729	57, 431	36, 662
1926	12, 086	6, 667	8, 386	8, 440	594	36, 173	35, 784
1927	22, 982	22, 630	11, 320	11, 061	1, 768	69, 761	23, 652
1928 [2]	27, 174	32, 764	16, 680	13, 554	2, 259	92, 431	45, 017

Bureau of Agricultural Economics. Compiled from reports of Minneapolis Chamber of Commerce, Duluth Board of Trade, Chicago Board of Trade, Milwaukee Chamber of Commerce, Omaha Grain Exchange, American Elevator and Grain Trade, and Canadian Grain Statistics.

[1] Crop year begins September.
[2] Beginning January, 1929, figures are subject to revision.

TABLE 87.—*Barley: Classification of cars graded by licensed inspectors, all inspection points*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE, BY CARS, ANNUAL 1926–1928

Year and class	Receipts of—											
	Choice No. 1	No. 1	Choice No. 2	Special No. 2	No. 2	Choice No. 3	No. 3	No. 4	No. 5	No. 1 feed	Sample	Total
Beginning July—	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1926 [1]	251	481	107	2, 168	2, 005	421	4, 929	4, 026	266	916	15, 063	30, 633
1927	262	2, 199	90	14, 913	12, 151	274	16, 299	6, 197	183	2, 875	10, 923	66, 366
1928	329	966	100	13, 128	20, 900	392	25, 264	20, 129	135	6, 500	11, 021	98, 864

TOTAL INSPECTIONS, BY GRADE AND CLASS, JULY 1, 1928, TO JUNE 30, 1929

Barley	5	619	49	13, 125	20, 594	130	24, 926	19, 856	35	6, 499	10, 821	96, 659
Black	0	0	0	0	0	0	0	1	0	0	0	1
Bright Western	290	312	48	3	290	222	268	221	89	0	163	1, 906
Western	29	27	3	0	11	40	62	48	11	0	33	264
Bright 2-Rowed	1	2	0	0	3	0	1	0	0	0	1	8
2-Rowed	4	1	0	0	0	0	1	0	0	1	1	8
Mixed	0	5	0	0	2	0	6	3	0	0	2	18

Bureau of Agricultural Economics.

[1] Barley grades became effective Aug. 24, 1926.

TABLE 88.—*Barley, excluding flour and malt: International trade, averages 1910–1914, annual 1926–1929*

Country	Year ended June 30									
	Average, 1910–1914		1926		1927		1928		1929 preliminary	
	Import	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Canada	66	5,210	10	30,893	29	42,533	3	25,131	8	38,668
Rumania	[1,2] 63	[1,2] 16,804	0	12,675	0	[3] 31,936	0	[3] 24,509	-------	-------
United States	0	7,896	0	27,181	0	17,044	0	36,580	0	56,996
Russia	[1] 124	[1] 173,240	0	36,940	0	20,465	-------	-------	-------	-------
Argentina	[4] 3	[4] 764	-------	6,383	-------	14,217	-------	11,598	-------	-------
British India	[1,5] 23	[1] 10,640	-------	697	-------	408	-------	8,289	-------	1,402
Czechoslovakia	0	0	1,709	5,134	9	5,070	64	7,367	14	3,643
Poland	0	0	94	7,374	111	4,678	138	3,084	102	7,989
Chile	[4] 88	[4] 1,062	0	2,480	0	5,516	0	2,478	0	2,137
Algeria	[1] 213	[1] 5,482	282	4,504	2,736	388	166	6,671	-------	-------
Tunis	[1] 328	[1] 3,055	-------	2,677	-------	3,747	1,309	1,016	-------	-------
Australia	[4] 159	[4] 51	0	760	1	2,106	-------	-------	-------	-------
Hungary	[1] 229	[1] 11,836	2	2,264	3	2,323	5	2,221	2	1,274
Bulgaria	0	[1] 1,876	0	1,117	0	1,025	0	3,488	-------	-------
Sweden	[1] 28	[1] 102	14	523	5	1,878	40	16	3	24
Yugoslavia [6]	0	0	-------	825	-------	1,284	375	1,095	484	256
PRINCIPAL IMPORTING COUNTRIES										
Germany	148,297	136	53,090	525	97,886	75	85,765	99	78,441	409
United Kingdom	48,550	-------	35,712	-------	29,708	-------	34,033	-------	31,392	-------
Netherlands	[1] 38,039	[1] 26,975	14,905	425	13,603	590	10,177	711	17,045	1,159
Belgium	18,351	3,079	13,361	250	11,618	205	11,856	333	14,616	192
Denmark	[1] 2,994	[1] 2,906	2,914	2,908	3,109	2,635	2,294	3,291	1,630	2,884
Austria	[1] 716	[1] 8,123	3,772	-------	2,962	159	2,849	315	-------	-------
Switzerland	[1] 1,140	[1] 1	3,102	0	2,534	0	2,841	0	4,252	0
France	6,711	787	2,188	701	1,708	263	1,495	3,108	5,514	452
Norway	[1] 4,550	0	1,652	0	1,227	0	1,314	0	1,102	0
Greece	0	0	314	0	1,028	0	145	0	603	0
Irish Free State	0	0	1,613	55	418	996	480	612	849	435
Spain	640	117	1,560	258	1	1,079	-------	-------	-------	-------
Cuba	255	0	536	0	328	0	171	0	-------	-------
Egypt	[1] 732	[1,7] 42	314	0	665	25	11	674	1	717
Italy	824	20	127	76	326	1	273	16	128	17
Syria and Lebanon	0	0	[3] 453	0	[3] 234	0	-------	-------	-------	-------
Estonia	0	0	[3] 273	0	81	0	195	0	516	0
Total, 33 countries	273,123	280,204	137,907	147,626	170,330	160,646	155,999	142,802	156,702	118,654

Bureau of Agricultural Economics. Official sources except where otherwise stated.

[1] Year ended July 31—International Yearbook of Agricultural Statistics.
[2] Average for season 1911–12 to 1913–14.
[3] International Crop Report and Agricultural Statistics.
[4] Average for calendar year 1909–1913.
[5] Average for season 1909–10 to 1911–12.
[6] Year ended December 31.
[7] Average for season 1912–13 to 1913–14.

TABLE 89.—*Barley: Estimated average price per bushel, received by producers United States, 1909–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	57.9	54.0	53.4	53.6	55.8	58.4	59.8	60.0	58.1	56.1	54.8	54.3	55.6
1910	56.0	56.6	55.7	56.6	58.8	62.0	63.6	66.0	71.6	73.9	72.0	69.7	60.8
1911	73.2	79.4	83.3	85.9	86.6	88.8	91.1	91.6	94.2	93.6	86.5	74.4	81.9
1912	60.2	54.2	54.3	52.2	50.2	50.6	50.2	48.8	48.4	50.5	53.2	52.2	52.7
1913	53.0	56.0	55.8	54.2	53.0	52.3	51.8	51.4	50.5	49.2	48.3	46.3	53.0
1914	48.8	52.2	51.8	53.0	54.3	58.6	65.3	66.2	64.2	62.9	58.9	56.2	54.8
1915	54.3	49.4	48.4	50.8	53.2	58.3	60.6	58.4	58.4	59.6	59.4	59.3	53.8
1916	66.1	74.7	79.8	85.6	87.6	89.9	94.8	99.6	111.2	119.7	113.0	110.6	83.4
1917	112.2	112.0	112.6	112.5	120.1	129.2	146.5	165.6	164.4	147.0	126.9	114.2	122.5
1918	105.4	98.2	95.2	93.3	91.5	89.0	86.1	89.0	98.3	106.6	108.8	113.6	100.0
1919	117.2	115.4	116.2	118.8	125.4	133.6	133.2	134.6	143.2	147.4	145.2	131.5	124.9
1920	113.0	98.1	86.4	76.5	67.8	60.8	57.0	55.6	51.8	50.4	51.1	50.0	70.7
1921	48.2	46.2	43.6	41.8	42.8	44.0	47.0	51.2	54.6	57.0	55.0	51.0	48.4
1922	47.7	46.2	49.2	52.0	55.6	56.8	56.2	58.0	59.6	60.8	58.3	54.7	51.8
1923	52.2	51.9	54.7	55.2	57.6	56.5	58.0	60.0	61.0	60.0	61.9	68.8	56.6
1924	75.7	75.6	81.4	79.7	76.2	82.4	84.8	81.5	76.1	75.9	76.4	73.5	77.4
1925	67.1	60.8	57.6	58.0	58.4	59.5	56.3	54.6	54.8	55.1	53.7	55.3	59.2
1926	55.0	52.9	54.4	56.0	56.4	58.0	61.3	62.2	64.1	68.4	76.3	71.4	61.9
1927	69.0	69.5	66.8	66.8	71.5	73.6	75.4	79.4	81.3	84.5	81.7	77.6	72.7
1928	58.9	54.1	55.2	54.5	55.0	56.2	60.5	60.1	58.0	55.3	52.6	55.6	56.1
1929	55.8	55.2	54.7	53.8	54.6	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of barley for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 90.—*Barley, No. 2: Weighted average price [1] per bushel of reported cash sales, Minneapolis, 1909–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	45	48	49	52	57	61	60	58	54	54	53	60	54
1910	61	63	63	66	70	77	74	81	88	75	77	87	74
1911	85	94	95	98	91	105	100	95	101	99	76	60	92
1912	46	49	50	47	45	49	48	46	46	50	52	48	48
1913	58	61	56	53	50	52	50	48	47	48	47	45	51
1914	59	58	55	59	57	68	75	70	70	70	66	68	65
1915	59	48	51	56	61	70	66	65	68	70	68	69	63
1916	81	81	103	111	107	117	117	121	136	148	138	149	117
1917	131	133	128	127	149	156	188	212	182	146	123	118	149
1918	102	95	91	94	92	90	87	93	109	113	112	121	100
1919	133	127	129	133	152	152	137	151	160	174	149	116	143
1920	102	99	92	82	74	69	65	67	61	59	57	62	74
1921	58	55	50	54	47	51	56	58	61	62	56	56	55
1922	49	54	57	60	61	57	60	59	64	61	58	59	58
1923	56	58	60	61	62	62	68	70	75	70	73	76	63
1924	80	81	85	81	87	93	94	88	81	84	84	84	84
1925	72	66	65	63	65	65	62	62	63	65	64	67	67
1926	63	62	65	64	67	69	71	72	77	88	88	81	71
1927	77	72	73	77	83	84	87	90	92	93	94	85	84
1928	65	63	63	62	62	66	70	67	65	60	60	69	65
1929	61	60	59	60	59	------	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Compiled from Minneapolis Daily Market Record.

[1] Average of daily prices weighted by car-lot sales.

Table 91.—*Flaxseed: Acreage, production, value, foreign trade, net supply, etc., United States, 1909–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Price per bushel of No. 1 flaxseed at Minneapolis, year beginning Sept. 1 [1]	Flaxseed, including linseed oil, in terms of seed. Year beginning September 1 [2]: Imports	Exports, domestic and foreign	Net imports	Net supply
	1,000 acres	*Bushels of 56 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*2,083*	*9.4*	*19,513*							
1909	2,083	9.5	19,699	152.8	30,093	206	6,074	152	5,922	25,621
1910	2,467	5.2	12,718	231.7	29,472	249	12,010	73	11,937	24,655
1911	2,757	7.0	19,370	182.1	35,272	214	7,848	126	7,722	27,092
1912	2,851	9.8	28,073	114.7	32,202	138	3,845	897	2,948	31,021
1913	2,291	7.8	17,853	119.9	21,399	152	9,772	216	9,556	27,409
1914	1,645	8.4	13,749	126.0	17,318	170	12,729	571	12,158	25,907
1915	1,387	10.1	14,030	174.0	24,410	204	14,441	313	14,128	28,158
1916	1,474	9.7	14,296	248.6	35,541	291	10,946	507	10,439	24,735
1917	1,984	4.6	9,164	296.6	27,182	378	14,042	467	13,575	22,739
1918	1,910	7.0	13,369	340.1	45,470	419	9,230	482	8,748	22,117
1919	*1,261*	*5.3*	*6,653*							
1919	1,503	4.8	7,178	438.5	31,475	452	26,483	467	26,016	33,194
1920	1,757	6.1	10,752	176.7	18,999	209	16,174	219	15,955	26,707
1921	1,108	7.2	8,029	145.1	11,648	219	23,389	149	23,240	31,269
1922	1,113	9.3	10,375	211.5	21,941	258	29,009	161	28,848	39,223
1923	2,014	8.5	17,060	210.7	35,951	244	19,557	145	19,412	36,472
1924	*3,485*	*8.2*	*28,246*							
1924	3,469	9.1	31,547	227.4	71,728	263	12,849	124	12,725	44,272
1925	3,078	7.3	22,424	226.5	50,783	252	20,858	148	20,710	43,134
1926	2,907	6.7	19,335	194.0	37,510	224	24,155	112	24,043	43,378
1927	2,837	9.1	25,847	186.0	48,079	220	18,177	120	18,057	43,904
1928	2,675	7.4	19,928	201.2	40,098	233	23,554	106	23,448	42,769
1929 [4]	2,990	5.6	16,838	284.3	47,871					

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 809, for data for earlier years.

[1] The figures shown, 1909–1920, are averages of daily closing prices compiled from annual reports of the Minneapolis Chamber of Commerce; 1921–1928, are averages of daily prices weighted by car-lot sales, compiled from Minneapolis Daily Market Record.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June, July, and August issues, 1919–1929, January issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce. 1 bushel of flaxseed weighs 56 pounds; 1 bushel of seed yields 2½ gallons of oil; and 1 gallon of oil weights 7½ pounds.

[3] Production minus net exports or plus net imports.

[4] Preliminary.

Table 92.—*Flaxseed: Acreage and production, by States, average 1923–1927 annual 1926–1929*

State	Acreage: Average, 1923–1927	1926	1927	1928	1929 [1]	Production: Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Wisconsin	10	11	10	9	7	123	132	132	122	84
Minnesota	710	814	757	726	523	7,156	7,652	7,343	5,808	4,707
Iowa	12	15	19	19	11	131	174	228	198	124
Missouri	[2] 3	2	7	7	6	[2] 20	16	46	56	36
North Dakota	1,401	1,380	1,242	1,143	1,463	10,255	7,590	10,184	8,344	6,876
South Dakota	492	475	594	554	637	3,925	2,755	5,940	3,601	3,758
Nebraska	6	7	7	8	17	57	61	70	64	129
Kansas	39	38	31	25	23	258	262	170	172	136
Montana	187	165	170	183	293	1,313	693	1,734	1,556	938
Wyoming				1	10				7	50
United States	2,861	2,907	2,837	2,675	2,990	23,243	19,335	25,847	19,928	16,838

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

[2] 4-year average.

TABLE 93.—*Flax: Acreage and production in specified countries, average 1909–1913 and 1921–1925, annual, 1927–1929*

Country	Acreage					Seed production					Fiber production				
	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929, preliminary
NORTHERN HEMISPHERE															
NORTH AMERICA															
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Canada	1,034,874	769,552	475,852	378,081	382,359	12,040	6,438	4,885	3,614	2,007					
United States	2,489,800	2,156,400	2,837,000	2,638,000	3,092,000	19,543	17,887	25,847	19,928	16,838					
Total North America	3,524,674	2,925,952	3,312,852	3,016,081	3,474,359	31,583	24,325	30,732	26,542	18,845					
EUROPE															
United Kingdom:															
England and Wales	436	7,801	3,504	5,543											
Northern Ireland	53,014	36,267	26,334	37,248	33,914						19,500	12,123	11,173	13,117	12,320
Irish Free State		8,288	5,998	8,032	6,283						4,200	2,662	2,218	2,636	
Sweden [2]	[3] 4,016	5,651				[4] 14	6				[4] 1,128	685			
Netherlands	33,055	27,839	26,714	39,158	47,456	376	324	205	504	524	17,276	16,166	15,133	30,600	27,117
Belgium	48,930	47,290	52,116	58,820	67,589	[3] 472	410	407	492	538	[3] 51,888	40,004	72,789	47,496	60,303
France	61,666	45,508	60,384	83,703	86,460	534	363	502	702	593	40,732	29,123	41,016	72,589	56,303
Spain	[5] 7,349	[4] 3,856	3,000			[3] 26	[4] 48	19			[3] 1,995	[4] 1,278	1,649		
Italy	[3] 42,852	51,700	43,220	44,000	28,000	[2] 340	451	298	315	264	6,675	5,159	4,608	5,090	7,196
Austria	12,787	9,055	9,209	12,000	12,100	112	55	51	44	41	7,480	7,433	13,653	9,788	17,505
Czechoslovakia	61,404	56,438	53,697	53,517	47,000	435	349	371	353	383	39,143	28,397	25,386	24,464	25,514
Hungary	7,967	6,918	5,105	7,070		63	48	31	54		6,671	5,237	3,086	2,784	
Yugoslavia	32,274	33,179	30,267	31,100		161					22,277	18,465	18,551	17,390	
Bulgaria	756	635	628	608	722	6	3	3	3	4	382	188	108	294	162
Rumania	[4] 71,253	40,021	48,800	48,000	43,000	[4] 707	224	241	241	278	[4] 11,044	[6] 10,770	5,353	3,978	
Poland	202,100	229,360	275,300	281,889		1,738	1,785	2,790	2,413		92,770	87,774	127,382	114,640	
Lithuania [2]	143,257	144,360	208,000	235,500	213,000	1,126	1,195	1,405	1,000	1,665	49,703	62,119	73,987	76,279	79,367
Latvia [2]	161,906	132,076	156,200	169,800	138,000	953	783	655	411	951	62,318	46,964	40,939	32,275	49,207
Estonia	135,193	75,365	88,086	82,881	79,000	733	387	368	229	461	49,518	22,187	21,267	17,195	23,369
Finland [2]	[6] 12,236	14,761	13,334	14,000	12,000						2,710	3,239	3,542	2,646	3,307
Russia, including Asiatic Russia	3,165,082	2,799,900	4,351,000	4,292,000		18,984	15,025	22,507	22,755		739,990	644,969	754,865	763,000	
Total European countries reporting all years	838,309	689,603	792,720	887,267	814,524	5,794	4,544	4,506	4,294	5,702	347,325	273,102	323,601	331,833	361,670

NORTH AFRICA															
Kenya	------	7,154	------	284	------	------	19	------	------	------	------	1,090	------	------	------
Morocco	[7] 18,060	40,844	59,000	54,000	43,000	[7] 248	363	375	488	393	------	------	------	------	------
Algeria	1,366	643	------	------	------	13	7	------	------	------	[5] 188	[3] 441	------	------	------
Tunis	(8,000)	5,996	6,150	7,000	5,400	37	30	28	51	39	------	------	------	------	------
Egypt	[5] 4,628	3,181	2,962	2,657	4,249	[8] 37	31	19	34	------	[6] 7,265	2,090	1,140	------	------
ASIA															
India	3,818,080	3,216,200	3,331,000	3,311,000	3,124,000	19,870	17,624	16,240	13,920	12,880	------	------	------	------	------
Japanese Empire:															
Japan	12,139	49,911	12,778	------	------	[4] 98	304	77	------	------	30,003	61,242	19,327	------	------
Chosen	3,000	3,386	3,905	3,987	------	------	------	------	------	------	------	1,141	1,185	1,147	------
Total Northern Hemisphere countries reporting all years	8,211,751	6,881,776	7,504,684	7,278,005	7,465,532	57,532	46,886	51,881	42,295	37,859	347,325	273,102	323,601	331,833	361,670
Estimated Northern Hemisphere total	11,648,000	10,030,000	12,195,000	11,934,000	------	78,666	64,159	77,332	67,727	------	1,264,900	1,110,900	1,258,800	1,277,600	------
SOUTHERN HEMISPHERE															
Chile	[4] 748	913	------	------	------	19	16	------	------	------	[4] 127	[4] 734	------	------	------
Uruguay	[4] 126,528	116,279	175,493	203,517	207,000	[4] 951	1,198	1,954	2,284	------	------	------	------	------	------
Argentina [9]	4,113,434	5,224,757	7,055,000	7,297,000	7,154,000	31,117	52,365	79,444	82,791	55,627	------	------	------	------	------
Australia	[5] 1,056	394	------	------	------	[5] 9	[4] 4	------	------	------	[5] 128	[3] 33	------	------	------
New Zealand	[6] 2,565	8,693	5,213	------	------	(40)	121	63	------	------	------	------	------	------	------
Total Southern Hemisphere countries reporting all years	4,239,962	5,341,036	7,230,493	7,500,517	7,361,000	31,117	52,365	79,444	82,791	55,627	------	------	------	------	------
Total Northern and Southern Hemisphere countries reporting all years	12,451,713	12,222,812	14,735,177	14,778,522	14,826,532	88,649	99,251	131,325	125,086	93,486	347,325	273,102	323,601	331,833	361,670
Estimated world total [10]	15,892,000	15,381,000	19,255,000	19,479,000	------	110,802	117,803	156,751	152,810	------	1,265,100	1,111,700	1,258,800	1,277,600	------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Estimates given are for crops harvested during the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Where changes in territory have occurred averages are estimates for territory within present boundaries.
[2] Flax and hemp.
[3] 3-year average.
[4] 4-year average.
[5] 2-year average.
[6] 1 year only, 1910.
[7] Average 1915–1918.
[8] 1 year only, 1912.
[9] Acreage figures are for area sown; figures of area harvested are not available for all years but over a 16-year period the harvested area averaged 10 per cent below the sown area.
[10] Excludes a few minor producing countries for which no statistics are available and which do not enter into world trade. No figures are included for Germany, whose acreage in 1913 was 37,800 acres and has now fallen from 118,000 acres in 1921 to 36,000 acres in 1928. No production figures are available.

TABLE 94.—*Flaxseed: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual, 1924–1929*

State	Yield per acre							Estimated price per bushel						
	Av., 1918–1927	1924	1925	1926	1927	1928	1929	Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Wisconsin	12.0	13.0	13.8	12.0	13.2	13.5	12.0	210	225	226	200	190	199	270
Minnesota	9.8	11.4	10.0	9.4	9.7	8.0	9.0	213	233	230	197	192	205	287
Iowa	10.5	11.7	10.5	11.6	12.0	10.4	11.3	209	225	220	195	195	198	275
Missouri	7.8	9.0	7.5	8.0	6.5	8.0	6.0	[1] 200	225	190	195	188	190	265
North Dakota	7.0	8.5	6.5	5.5	8.2	7.3	4.7	208	227	226	193	184	201	287
South Dakota	8.2	8.6	6.8	5.8	10.0	6.5	5.9	206	223	225	190	185	201	280
Nebraska	8.5	7.0	9.0	8.7	10.0	8.0	7.6	205	225	230	185	175	190	280
Kansas	6.4	6.5	6.8	6.9	5.5	6.9	5.9	203	215	200	200	185	185	234
Montana	5.5	8.7	4.5	4.2	10.2	8.5	3.2	199	221	220	185	175	192	280
Wyoming	------	------	------	------	------	7.0	5.0	------	------	------	------	------	195	275
United States	7.5	9.1	7.3	6.7	9.1	7.4	5.6	208.9	227.4	226.5	194.0	186.0	201.2	284.3

Bureau of Agricultural Economics. Estimates of crop-reporting board.

[1] 4-year average.

TABLE 95.—*Flaxseed: Monthly marketings by farmers, as reported by about 3,500 mills and elevators, United States, 1917–1928*

Year beginning July	Percentage of year's receipts												
	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Season
1917	1.8	3.6	21.5	28.1	17.6	7.6	4.7	4.0	4.8	1.8	1.6	2.9	100.0
1918	1.8	2.9	14.8	21.5	15.0	10.9	5.2	4.4	5.8	4.3	5.0	8.4	100.0
1919	3.6	8.0	20.6	22.2	11.1	7.4	5.0	6.3	3.1	3.1	2.6	7.0	100.0
1920	2.1	4.7	23.6	28.6	13.0	6.2	5.0	3.3	3.1	2.1	3.4	4.9	100.0
1921	6.4	10.9	20.7	25.7	12.0	6.9	4.3	2.8	3.0	2.4	2.1	2.8	100.0
1922	2.5	13.4	27.6	23.3	11.4	5.9	4.7	3.0	2.7	2.3	1.6	1.6	100.0
1923	1.1	10.0	30.7	27.3	12.1	6.0	2.6	2.3	2.0	1.5	2.1	2.3	100.0
1924	.5	5.3	23.0	34.5	17.8	6.7	3.8	2.7	1.8	1.4	1.2	1.3	100.0
1925	1.1	11.1	34.3	23.5	12.4	5.6	2.7	2.0	1.8	1.5	1.9	2.1	100.0
1926	1.4	12.0	25.5	32.5	11.2	6.3	2.4	2.3	1.7	.9	1.7	2.1	100.0
1927	1.0	6.1	32.9	33.4	10.5	5.3	3.0	1.9	1.9	1.2	1.7	1.1	100.0
1928	1.1	7.2	31.1	35.3	11.6	5.3	2.1	1.2	1.4	1.0	1.5	1.2	100.0

Bureau of Agricultural Economics.

TABLE 96.—*Flaxseed: Commercial stocks in store, 1926–27 to 1929–30*

DOMESTIC FLAXSEED IN UNITED STATES[1]

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1926–27					2, 684	2, 328	2, 089	2, 014	1, 834	1, 396	1, 445	909
1927–28	584	1, 583	5, 353	4, 703	4, 247	3, 542	2, 816	2, 178	1, 691	882	781	615
1928–29	317	704	2, 721	1, 343	1, 397	1, 142	780	681	547	398	434	370
1929–30	159	924	1, 179	610								

CANADIAN FLAXSEED IN UNITED STATES[2]

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
1926–27					14	14	17	17	17	57	11	13
1927–28	0	0	1	12	17	18	18	0	0	0	0	1
1928–29	1	1	0	0	0	0	0	0	0	0	0	0
1929–30	0	0	0	0								

Bureau of Agricultural Economics. Compiled from weekly reports to the Grain, Hay, and Feed Market News Service. Data are for stocks on the Saturday nearest the 1st day of the month.

[1] Includes flaxseed in store in public and private elevators in 39 important markets and also the flaxseed afloat in vessels or barges in the harbors of lake and seaboard ports. Flaxseed in transit either by rail or water, mill stocks, or small private stocks of flaxseed intended only for local purposes, not included.

[2] Includes flaxseed stored at lake and seaboard ports, exclusive of flaxseed in transit on lakes and canals.

TABLE 97.—*Flaxseed: Receipts at Minneapolis, 1909–1929*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909	999	2, 219	1, 892	601	966	670	826	437	222	159	123	137	9, 251
1910	854	1, 530	1, 292	535	338	300	232	112	118	122	133	191	5, 757
1911	563	1, 212	1, 570	1, 716	531	459	397	468	571	440	487	160	8, 574
1912	700	1, 657	1, 520	2, 245	1, 450	1, 246	1, 057	742	518	514	432	281	12, 362
1913	756	1, 686	1, 505	1, 131	711	478	592	270	139	165	233	117	7, 783
1914	901	1, 890	1, 247	1, 016	599	443	384	142	77	146	239	115	7, 199
1915	347	1, 038	1, 506	1, 113	319	399	810	486	440	363	441	199	7, 461
1916	316	2, 380	1, 694	1, 045	544	442	441	384	263	565	325	92	8, 491
1917	265	980	1, 112	614	533	553	527	283	349	648	208	94	6, 166
1918	536	915	857	788	558	473	829	439	436	942	642	196	7, 611
1919	753	570	568	492	344	368	409	159	295	522	554	297	5, 331
1920	580	1, 444	861	699	298	269	364	434	578	572	338	289	6, 726
1921	509	1, 144	375	354	308	200	254	196	300	220	157	288	4, 296
1922	909	1, 121	580	577	447	249	319	476	401	481	359	1, 019	6, 938
1923	2, 654	1, 953	1, 308	877	358	250	229	210	296	296	264	269	8, 964
1924	2, 265	3, 475	2, 781	1, 375	1, 244	750	671	374	402	442	286	1, 094	15, 159
1925	3, 331	2, 745	1, 107	722	375	276	320	357	431	360	294	830	11, 148
1926	1, 539	2, 905	1, 103	669	415	318	273	169	257	277	145	441	8, 511
1927	4, 465	3, 894	1, 065	490	716	495	471	311	439	457	143	652	13, 598
1928 [1]	3, 454	3, 690	1, 278	601	373	328	328	255	244	314	180	1, 249	12, 294
1929 [1]	2, 939	1, 759	868	403									

Bureau of Agricultural Economics. Compiled from annual reports of the Minneapolis Chamber of Commerce.

[1] Beginning January, 1929, figures are from the Minneapolis Daily Market Record, and are subject to revision.

TABLE 98.—*Linseed oil: Flaxseed used in production of oil, and quantity of oil produced, United States, 1919–1928*

Year beginning Oct. 1	Flaxseed crushed				
	October–December	January–March	April–June	July–September	Total
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1919	7,684	6,336	6,407	6,542	26,969
1920	6,341	6,343	6,332	5,812	24,828
1921	7,539	6,713	3,441	5,583	23,276
1922	8,602	8,292	8,689	8,223	33,806
1923	8,970	9,575	9,434	7,550	35,529
1924	11,530	12,516	9,128	7,822	40,996
1925	11,798	10,651	7,767	9,500	39,716
1926	11,085	11,037	8,963	9,051	40,136
1927	12,699	11,885	9,608	7,603	41,795
1928 (preliminary)	11,191	10,723	9,816	10,166	41,896
	Oil produced				
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1919	139,960	117,226	121,407	126,138	504,731
1920	120,502	118,787	118,887	107,716	465,892
1921	137,528	124,941	70,239	102,581	435,289
1922	158,753	155,148	178,267	154,588	646,756
1923	165,560	177,583	176,187	139,862	659,192
1924	211,954	229,544	169,980	146,306	757,784
1925	217,992	194,607	144,950	174,057	731,606
1926	206,496	202,162	167,232	169,274	745,164
1927	238,046	223,751	179,532	141,889	783,218
1928 (preliminary)	206,273	200,123	184,088	188,769	779,253

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census, "Animal and vegetable fats and oils."

TABLE 99.—*Flaxseed: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning September	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	123.0	131.3	146.4	162.0	182.0	193.0	193.5	201.7	202.5	189.5	196.6	214.8	148.6
1910	227.2	231.8	230.6	226.4	227.5	237.3	237.6	238.2	233.4	215.3	202.4	201.4	229.8
1911	204.3	207.8	196.4	184.6	189.0	187.4	187.6	186.2	193.0	201.7	186.8	168.9	195.8
1912	155.2	140.6	124.0	110.4	107.8	114.2	116.3	114.0	115.0	114.6	116.0	123.2	127.4
1913	125.2	120.6	119.3	122.0	126.0	130.2	132.6	133.8	135.8	136.4	143.4	145.0	123.9
1914	133.4	123.0	122.4	130.4	149.2	160.8	162.8	168.6	169.6	161.0	148.6	144.0	131.6
1915	145.8	155.5	168.4	180.0	198.4	206.7	202.3	197.0	184.2	169.8	170.6	184.2	169.6
1916	194.7	217.0	241.6	249.6	252.2	253.4	259.6	283.4	299.7	288.4	274.8	287.2	233.8
1917	305.6	302.2	296.2	303.7	318.8	338.2	364.8	376.5	368.4	356.4	379.9	395.8	315.9
1918	381.0	357.4	337.0	333.9	318.9	318.8	338.0	355.0	375.4	416.7	492.4	529.0	374.2
1919	477.8	410.2	410.3	436.0	445.0	464.6	464.2	452.0	434.6	390.4	331.6	297.0	427.0
1920	285.0	259.9	208.4	170.2	160.0	153.4	146.5	134.2	135.7	145.8	154.0	163.4	217.6
1921	163.8	154.0	145.0	148.1	162.1	194.6	217.4	224.6	233.8	230.0	217.2	200.8	171.0
1922	189.1	199.4	211.0	217.8	229.9	245.4	261.6	279.5	273.1	248.4	228.8	210.4	209.5
1923	208.4	212.1	211.4	218.8	218.8	224.9	223.7	217.7	222.6	213.1	218.1	210.2	212.3
1924	201.2	210.8	222.7	235.8	271.8	275.3	267.8	244.7	251.8	246.8	227.6	229.5	220.7
1925	227.9	228.9	228.1	232.1	224.5	216.4	202.9	207.0	205.4	203.9	208.7	215.7	224.6
1926	211.3	197.5	195.5	196.4	193.0	195.7	195.1	196.1	205.7	204.7	198.4	203.7	205.8
1927	197.1	191.2	184.2	185.3	188.4	189.9	194.8	198.4	210.5	209.0	195.5	181.7	192.0
1928	181.6	198.1	198.1	205.4	211.1	218.4	219.2	216.4	214.7	217.0	233.2	259.5	205.5
1929	285.4	300.5	285.1	287.7	------	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of flaxseed for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices on 1st of month and 1st of succeeding month, September, 1909–December, 1923.

TABLE 100.—*Flaxseed: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average, 1911–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Argentina	1	25, 562	0	37, 821	1	65, 866	0	74, 585	0	76, 547
British India	[1] 325	[1] 14, 409	517	[2] 14,246	823	[2] 7, 455	968	[2] 8, 670	[2] 632	[2] 6, 835
Canada	89	10, 645	0	5, 502	810	2, 653	354	2, 185	300	2, 950
Uruguay	0	994	0	1, 474	0	2, 093	0	2, 274	0	2, 379
Russia	80	5, 739	30	[3] 1, 958	30	[3] 1, 833	[3] 0	[3] 94	------	------
Lithuania	0	0	0	810	0	1, 014	0	985	0	275
Latvia	0	0	576	989	324	672	512	577	699	379
Morocco	0	338	0	304	0	296	0	476	------	------
Eritrea [3]	0	0	1	379	0	258	0	178	------	------
China	0	648	0	199	0	155	0	221	------	------
Poland	0	0	145	370	244	56	552	61	851	317
Estonia	0	0	11	36	0	196	24	69	76	12
Tunis	0	39	0	53	0	31	0	46	0	64
Rumania	19	120	1	25	0	100	[3] 0	[3] 107	------	------
PRINCIPAL IMPORTING COUNTRIES										
United States	7, 298	101	16, 510	0	22, 550	0	21, 821	0	17, 579	0
United Kingdom	15, 908	0	13, 521	0	14, 324	0	14, 104	0	13, 893	0
Netherlands	8, 741	2, 488	10, 221	232	12, 927	231	14, 372	148	16, 481	164
France	6, 304	60	5, 907	20	7, 145	20	7, 081	18	8, 271	15
Germany	15, 312	210	9, 871	66	12, 545	50	15, 715	67	17, 439	67
Belgium	9, 313	5, 965	3, 153	284	3, 662	300	3, 937	219	5, 007	326
Italy	1, 698	1	1, 836	2	2, 272	1	2, 878	0	2, 633	0
Sweden	911	7	1, 335	0	1, 547	0	1, 467	0	1, 652	0
Australia	103	0	[3] 863	[3] 0	[3] 801	[3] 0	[3] 825	[3] 0	------	------
Denmark	1	0	574	0	916	0	557	0	857	0
Czechoslovakia	0	0	668	11	761	11	930	2	956	7
Norway	445	0	597	0	613	0	572	0	648	0
Spain	0	0	516	0	613	0	------	0	------	0
Japan	[4] 27	[4] 27	362	0	288	1	368	0	676	0
Finland	110	0	192	0	165	0	197	0	242	0
Hungary	0	0	31	8	82	10	101	12	118	26
Austria	[5] 1, 913	[5] 41	[3] 23	[3] 0	10	0	13	0	14	0
Total, 31 countries	68, 596	67, 394	67, 431	64, 789	83, 423	83, 302	87, 343	90, 994	89, 024	90, 363

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] 2-year average.
[2] Sea trade only.
[3] International Yearbook of Agricultural Statistics.
[4] 1 year only.
[5] Average for Austria-Hungary.

TABLE 101.—*Flaxseed, No. 1: Average price per bushel, Minneapolis, 1909–1929*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	141	157	175	193	218	218	225	238	222	204	234	247	206
1910	266	262	261	242	260	268	260	256	247	224	210	234	249
1911	247	235	204	206	215	206	206	215	223	225	197	186	214
1912	176	160	135	125	129	134	126	129	130	131	138	147	138
1913	145	138	135	144	149	153	158	154	156	159	168	164	152
1914	151	138	145	154	188	186	191	193	195	176	167	167	170
1915	170	186	199	207	231	232	227	218	196	180	196	215	204
1916	211	254	278	284	289	281	290	318	333	311	301	346	291
1917	338	316	329	340	360	374	408	409	393	386	440	439	378
1918	409	359	377	354	341	345	375	388	412	486	594	587	419
1919	492	432	483	499	512	509	502	468	453	392	348	328	452
1920	323	283	227	206	196	182	178	158	184	186	189	201	209
1921	203	181	181	189	213	246	257	270	280	250	259	229	219
1922	228	238	248	262	280	304	307	340	294	280	270	234	258
1923	238	248	242	246	250	258	249	247	246	244	247	244	244
1924	226	240	258	284	315	312	297	279	280	268	249	254	263
1925	259	258	256	261	250	248	232	234	230	238	244	238	252
1926	233	221	222	224	223	225	222	224	234	225	223	222	224
1927	221	218	218	215	224	227	233	236	246	238	221	205	220
1928	209	228	235	239	245	255	249	245	245	248	276	279	233
1929	323	332	324	322	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. The figures shown for 1909–1920 are averages of daily closing prices compiled from annual reports of the Minneapolis Chamber of Commerce; 1921 to date are averages of daily prices weighted by car-lot sales, compiled from Minneapolis Daily Market Record. Data 1899–1908 available in 1924 Yearbook, p. 646, Table 126.

TABLE 102.—*Linseed oil: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Netherlands	457	73, 634	164	146, 519	914	164, 911	579	150, 621	1, 187	155, 926
United Kingdom	58, 018	58, 013	38, 407	56, 786	31, 924	51, 336	47, 815	44, 628	50, 434	49, 327
Belgium	10, 233	26, 790	1, 659	27, 101	4, 054	15, 114	759	21, 009	2, 125	24, 465
PRINCIPAL IMPORTING COUNTRIES										
Germany	5, 231	4, 377	58, 779	4, 869	41, 826	6, 701	44, 057	5, 525	29, 188	10, 342
United States	2, 605	4, 105	13, 607	2, 487	15, 041	2, 567	946	2, 525	173	1, 965
France	3, 382	10, 931	9, 250	3, 311	15, 480	4, 121	6, 159	4, 783	7, 636	5, 242
Switzerland	7, 825	16	11, 047	5	13, 033	25	14, 234	4	14, 771	73
Brazil	8, 726	0	11, 724	0	10, 285	0	-------	-------	-------	-------
Austria	[1] 16, 367	[1] 6, 542	7, 635	[2] 347	8, 807	437	8, 956	591	10, 455	510
Australia [2]	[3] 12, 252	[3] 0	6, 247	42	5, 802	36	4, 575	10	-------	-------
Finland	812	0	4, 490	0	5, 154	0	5, 954	0	6, 507	0
Union of South Africa	3, 449	0	4, 122	0	4, 804	0	4, 259	0	5, 082	0
Egypt	3, 647	0	4, 901	3	5, 211	4	4, 825	2	5, 054	-------
Dutch East Indies	[4] 3, 199	0	4, 831	0	4, 683	0	5, 034	0	[5] 3, 511	0
New Zealand	4, 188	0	3, 673	7	5, 216	5	2, 869	0	3, 667	0
Hungary	0	0	3, 757	53	3, 841	16	6, 398	15	5, 704	1
Norway	1, 609	[2] 31	2, 328	[2] 6	3, 591	[2] 27	3, 148	[2] 17	3, 191	-------
Italy	1, 042	165	1, 139	460	1, 604	400	4, 227	427	7, 441	358
Chile	2, 854	15	2, 113	0	[2] 2, 802	[2] 0	-------	-------	-------	-------
British India	3, 430	1, 967	2, 139	842	2, 168	414	1, 885	547	2, 392	576
Yugoslavia	[2] [6] 445	[2] 0	2, 393	27	57	188	1, 788	7	1, 633	31
Czechoslovakia	0	0	2, 032	72	2, 227	6	1, 098	40	811	11
Canada	2, 279	0	341	66	937	56	738	53	734	53
Denmark	-------	-------	2, 110	112	1, 675	30	1, 972	314	2, 379	1, 198
Philippine Islands	809	0	748	0	952	0	1, 155	0	-------	-------
Greece	246	0	743	[2] 161	312	0	280	0	453	-------
Argentina	886	[6] 2	1, 015	503	715	391	587	238	-------	-------
Sweden	933	5	387	937	905	1, 019	560	1, 189	580	1, 436
Total, 28 countries	154, 924	186, 593	201, 781	244, 716	194, 020	247, 804	174, 857	232, 545	165, 108	251, 514

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

[1] Average for Austria-Hungary.
[2] International Yearbook of Agricultural Statistics.
[3] From original source.
[4] 2-year average.
[5] Java and Madura only.
[6] 4-year average.

TABLE 103.—*Linseed oil, raw: Average car-lot price per gallon in barrels, New York, 1910–1929*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	90	90	95	95	95	96	96	91	91	89	87	80	91
1911	87	88	84	71	74	71	70	73	73	76	77	66	76
1912	66	62	56	43	42	46	45	44	46	45	47	49	49
1913	50	47	46	48	48	48	50	51	50	50	52	59	50
1914	57	49	44	45	48	56	55	58	62	63	54	50	53
1915	52	55	60	61	66	72	77	76	75	67	63	71	66
1916	70	82	90	92	94	95	94	107	121	121	112	118	100
1917	125	118	115	121	129	129	141	157	157	157	164	188	142
1918	190	183	155	158	150	145	148	154	161	181	210	222	171
1919	204	179	175	182	177	177	180	183	169	165	152	141	174
1920	122	120	98	82	78	66	66	61	70	75	75	74	82
1921	74	68	67	67	72	82	82	84	90	84	89	87	79
1922	88	89	88	89	89	95	102	116	115	112	104	97	99
1923	90	94	92	92	92	91	93	90	94	94	98	102	94
1924	102	102	108	110	117	116	111	104	105	106	98	102	107
1925	103	[1] 99	96	95	87	85	80	81	81	84	89	90	89
1926	83	81	81	80	79	78	77	81	84	84	80	80	81
1927	77	74	73	72	74	74	74	74	78	77	75	73	75
1928	74	76	77	75	75	76	76	76	77	79	92	96	79
1929	116	118	111	110	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Figures for 1910–1915 from Monthly Labor Review; 1916–1918 from War Industries Board Price Bulletin; 1919–1928 from Oil, Paint, and Drug Reporter, average of weekly range.

[1] Beginning October, 1925, prices were quoted on pound basis and have been converted to price per gallon by multiplying by 7.5.

TABLE 104.—*Linseed meal: Average wholesale price per ton, Minneapolis, 1909–1929*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	32.00	31.20	32.60	33.38	35.14	35.50	35.06	34.50	34.50	30.17	31.38	33.04	33.21
1910	33.50	33.04	32.15	32.77	33.90	34.45	32.48	31.13	32.00	32.00	32.00	35.24	32.89
1911	36.64	37.00	35.84	36.69	38.00	37.80	36.67	34.83	34.00	33.08	33.00	33.00	35.55
1912	33.00	31.89	31.22	29.26	28.73	28.36	27.04	26.15	25.50	25.50	25.98	30.75	28.62
1913	32.00	31.26	29.25	29.00	29.96	30.25	28.73	29.00	29.42	30.73	31.50	31.50	30.22
1914	31.02	29.22	32.70	34.00	37.52	38.07	35.08	32.22	31.50	32.50	34.54	35.08	33.62
1915	37.50	37.50	36.86	37.56	37.38	37.00	34.31	32.12	29.27	30.18	32.25	34.50	34.70
1916	37.50	39.02	43.96	46.40	45.12	44.45	43.50	45.46	47.81	45.92	49.71	54.62	45.29
1917	56.67	57.50	56.22	59.98	57.69	57.75	59.17	60.00	59.46	57.28	57.62	59.00	58.20
1918	59.00	59.96	60.00	62.40	76.56	67.71	65.12	68.00	69.36	70.25	80.83	93.23	69.37
1919	85.29	76.21	79.22	84.40	84.58	82.59	79.00	72.48	70.58	68.24	68.00	67.04	76.47
1920	67.00	64.69	55.25	46.00	42.42	40.64	44.77	39.69	33.38	33.65	40.50	43.59	45.96
1921	42.84	39.08	41.38	47.00	48.00	50.86	55.81	54.38	53.23	51.00	48.28	46.44	48.19
1922	43.32	50.46	53.65	54.88	57.62	55.23	49.19	47.00	45.81	41.88	43.84	49.28	49.35
1923	52.21	52.78	50.92	49.76	49.31	45.74	45.10	43.20	42.58	44.44	47.16	48.73	47.66
1924	48.08	50.00	48.86	50.58	51.31	49.91	45.08	43.68	45.96	47.63	47.98	49.08	48.18
1925	47.78	46.96	47.35	48.72	50.09	52.70	50.37	52.44	53.60	50.69	50.86	49.54	50.09
1926	47.83	46.56	46.11	46.91	47.76	48.12	51.31	51.82	50.84	49.12	48.00	48.72	48.59
1927	49.50	48.46	48.00	48.00	50.92	52.00	53.30	54.06	57.44	55.33	52.82	49.17	51.58
1928	49.75	57.33	59.00	61.43	60.85	63.29	61.29	58.52	58.99	55.39	56.31	56.31	58.20
1929	59.57	60.00	59.31	58.66									

Bureau of Agricultural Economics. Compiled from the Minneapolis Daily Market Record.

TABLE 105.—*Rice, rough: Acreage, production, value, exports, etc., United States, 1909–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Foreign trade, mostly cleaned rice but including rice bran, meal, and broken rice, year beginning July 1[1]			
						Domestic exports	Shipments from United States to Alaska, Hawaii, and Porto Rico	Imports	Net balances[2]
	1,000 acres	*Bushels of 45 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*610*	*35.8*	*21,839*						
1909	610	33.8	20,607	79.5	16,392	964	4,276	8,114	−2,581
1910	723	33.9	24,510	67.8	16,624	1,082	4,606	7,516	−1,605
1911	696	32.9	22,934	79.7	18,274	1,420	4,890	6,842	−157
1912	723	34.7	25,054	93.5	23,423	1,401	4,806	7,996	−1,332
1913	827	31.1	25,744	85.8	22,090	807	5,244	10,447	−3,756
1914	694	34.1	23,649	92.4	21,849	2,789	4,640	9,979	−419
1915	803	36.1	28,947	90.6	26,212	4,391	5,191	9,516	+2,651
1916	869	47.0	40,861	88.9	36,311	6,529	5,818	7,778	+6,167
1917	981	35.4	34,739	189.6	65,879	7,069	4,878	16,418	−1,148
1918	1,119	34.5	38,606	191.8	74,042	6,953	5,995	13,094	+7,638
1919	*911*	*38.8*	*35,331*						
1919	1,063	39.5	41,985	266.6	111,913	17,402	5,547	6,477	+19,948
1920	1,336	39.0	52,066	119.1	62,036	15,871	6,614	3,485	+21,217
1921	921	40.8	37,612	95.2	35,802	19,494	7,179	2,650	+25,952
1922	1,055	39.2	41,405	93.1	38,562	13,344	8,290	2,503	+20,308
1923	895	37.7	33,717	110.2	37,150	8,199	9,094	1,376	+16,416
1924	*744*	*39.7*	*29,536*						
1924	850	38.2	32,498	138.5	45,009	4,033	8,152	2,076	+10,687
1925	889	37.5	33,309	153.8	51,232	1,734	8,049	4,747	+5,535
1926	1,034	40.4	41,730	109.6	45,722	10,957	8,743	2,558	+17,587
1927	1,012	44.2	44,774	92.9	41,616	11,152	9,183	1,588	+19,035
1928	977	44.3	43,240	88.5	38,277	14,138	10,131	1,325	+23,404
1929[3]	893	45.0	40,217	97.8	39,346				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 819, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce.

[2] The difference between the total exports (domestic exports plus reexports plus shipments to Alaska, Hawaii, and Porto Rico) and total imports. Net exports indicated by +; net imports indicated by −.

[3] Preliminary.

TABLE 106.—*Rice: Acreage, yield per acre, and production in specified countries, average 1909–1913, 1921–1925, annual, 1927–1929*

Country	Acreage: Average, 1909–1913	Acreage: Average, 1921–1925	Acreage: 1927	Acreage: 1928	Acreage: 1929, preliminary	Yield per acre: Average, 1909–1913	Yield per acre: Average, 1921–1925	Yield per acre: 1927	Yield per acre: 1928	Yield per acre: 1929, preliminary	Production, in terms of cleaned rice: Average, 1909–1913	Production: Average, 1921–1925	Production: 1927	Production: 1928	Production: 1929, preliminary
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*
United States	716	922	1,012	977	893	922	1,076	1,229	1,229	1,251	660	992	1,244	1,201	1,117
Mexico	[1] 66	[2] 110	112	118		[1] 515	[2] 682	893	1,000		[1] 34	75	100	118	
Hawaii	[1] 9	[3] 6	3								[1] 26	[1] 18			
Central and South America and West Indies:															
Guatemala		6	4	3							[2] 2	3	2	2	
Salvador		[3] 13									[1] 9	[3] 17			
Costa Rica	[1] 7	[4] 17	18				[2] 294	278				[2] 5	5		
Colombia	[5] 15	[2] 42	41			[5] 1,133	[2] 500	488			[5] 17	[2] 21	20		
Ecuador												[2] 41			
British Guiana	36	44	50	56		1,500	1,182	1,560	1,446		54	52	78	81	
Dutch Guiana				40					425		2	14	15	17	
Porto Rico	[1] 16					[1] 250					[1] 4		2		
Trinidad and Tobago	[4] 12	[3] 8	[illegible]									[3] 3	4		
Europe:															
Spain	94	115	120	121	120	3,191	3,270	3,508	3,264	3,450	300	376	421	395	414
Portugal	[5] 17	18	31			[5] 1,353	1,278	968			[5] 23	23	30		
Italy	358	316	351	333	339	1,804	2,316	2,698	2,580	2,702	646	732	947	859	916
Yugoslavia	[6] 5	4	4	4	4						[6] 3	3	2	3	3
Bulgaria	7	11	18	18	15			1,000	1,278	1,400	9	14	18	23	21
French West Africa:															
French Guinea		[2] 2,008	2,100	1,977			487	648	551			[4] 978	1,361	1,089	
French Senegal		119	99	111			546	444	532			65	44	59	
Upper Volta		[3] 44	29				[3] 136	150				[3] 6	3	3	
Sierra Leone	[7] 250	390	400	400		[7] 828	797	932	932		[7] 207	311	373	373	
Egypt	257	192	436	265		2,132	1,536	1,661			548	295	724		
Asia:															
Turkey [8]	[1] 153		25			[1] 1,118		560			[1] 171		14		
India	67,004	81,400	78,318	82,126		957	863	808	864		64,144	70,270	63,244	70,972	
Andaman and Nicobar		3	4	4								3	2	2	
British North Borneo	[7] 64	62	69	71		[7] 594	677	870	577		[7] 38	42	60	41	
Brunei		[3] 3	2	4								[4] 2	1	3	
French Establishments in India	40	45	44	47		650	644	614	574		26	29	27	27	
Japanese Empire—															
Japan	7,300	7,705	7,778	7,822	7,847	2,163	2,350	2,508	2,422	2,337	15,787	18,107	19,510	18,944	18,338
Chosen (Korea)	2,905	3,824	3,927	3,720	3,999	1,134	1,191	1,384	1,141	1,084	3,293	4,556	5,435	4,245	4,334
Taiwan (Formosa)	1,193	1,283	1,446	1,456		1,184	1,362	1,503	1,492		1,413	1,747	2,174	2,173	
Kwantung	1	4	2	2							1	3	4	4	

French Indo-China	[2] 8,550	11,953	13,526	....	....	[2] 858	643	648	....	....	[2] 7,332	7,682	8,763	....	....
Siam	4,555	5,964	6,310	....	....	935	1,017	992	....	....	4,258	6,065	6,261	....	....
Federated Malay States	[2] 124	197	....	....	....	[2] 637	629	....	....	....	[2] 79	124	....	....	....
Unfederated Malay States	....	407	....	....	....	....	698	....	....	....	....	284	....	....	....
Straits Settlements	93	72	....	....	....	....	1,042	....	....	....	....	75	....	....	....
Philippine Islands	2,817	4,229	4,416	....	....	431	649	698	....	....	1,213	2,744	3,082	....	....
Ceylon	695	799	835	834	....	587	589	653	638	....	408	471	545	532	....
SOUTHERN HEMISPHERE															
Brazil	....	[4] 1,029	873	....	....	....	996	1,283	....	....	[1] 90	1,025	1,120	....	....
Argentina	[2] 8	16	11	....	....	....	1,312	....	....	....	[2] 8	[4] 21	10	....	....
Belgian Congo	....	27	38	....	....	....	222	211	....	....	....	6	8	....	....
Madagascar	[3] 1,009	[4] 1,298	1,483	....	....	[3] 888	[4] 1,018	964	....	....	[3] 896	[4] 1,322	1,429	....	....
Java and Madura:															
Irrigated	5,953	7,135	7,553	7,543	7,339	1,005	927	971	929	895	5,983	6,615	7,331	7,007	6,569
Nonirrigated	[9] 950	879	1,203	1,173	1,110	[9] 471	501	563	561	568	[9] 450	440	677	662	631
Total, Java and Madura	6,900	8,014	8,756	8,716	8,449	932	880	915	880	852	6,433	7,055	8,008	7,669	7,200
Fiji Islands	[3] 12	11	....	....	....	....	....	....	....	....	[3] 23	7	....	....	....
Total, 8 countries reporting acreage and production, all periods	18,285	20,911	21,966	21,711	21,666	1,484	1,522	1,620	1,536	1,493	27,131	31,835	35,585	33,339	32,343
Estimated world total, exclusive of China [10]	....	....	....	....	....	....	....	....	....	....	109,000	126,000	126,000	130,000	....

Bureau of Agricultural Economics. Official Sources and International Institute of Agriculture. Yields have not been calculated when total acreage is below 15,000 acres, Acreage and production data, in most cases, are for crops harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] 1 year only.
[2] 2-year average.
[3] 3-year average.
[4] 4-year average.
[5] Year 1915.
[6] Pre-war average.
[7] Year 1914.
[8] European Turkey included.
[9] Rough estimate for nonirrigated rice.
[10] Unofficial estimates of the Chinese crops are as follows: 70,219,000,000 pounds in 1917; 52,788,000,000 pounds in 1920; and 50,056,000,000 pounds in 1923.

TABLE 107.—*Rice, rough: Acreage and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage					Production				
	Average, 1923–1927	1926	1927	1928	1929 [1]	Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Missouri	[2] 4	10	3	10	1	[2] 259	610	75	400	35
South Carolina	[2] 6	5				[2] 109	85			
Georgia	[2] 3	3				[2] 58	60			
Mississippi	[2] 1	1				[2] 16	18			
Arkansas	170	199	175	164	154	7, 598	10, 547	7, 700	7, 823	7, 084
Louisiana	473	501	500	487	472	16, 481	16, 282	20, 000	18, 750	19, 352
Texas	160	166	174	184	171	6, 407	6, 142	8, 039	8, 096	7, 524
United States, except California	814	885	852	845	798	30, 849	33, 744	35, 814	35, 069	33, 995
California	122	149	160	132	95	6, 356	7, 986	8, 960	8, 171	6, 222
United States	936	1, 034	1, 012	977	893	37, 206	41, 730	44, 774	43, 240	40, 217

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary. [2] 4-year average.

TABLE 108.—*Rice, in terms of cleaned rice: World production, 1909–1929*

Year	Estimated world production, exclusive of China	Production in chief producing countries [1]							
		India	Japan	Indo-China	Java and Madura [2]	Siam [3]	Chosen	Philippines	United States
	1,000,000 pounds	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*	*1,000,000 pounds*
1909	107, 000	63, 869	16, 474		5, 723	3, 734	2, 343	1, 164	572
1910	106, 000	64, 552	14, 650		5, 738	3, 466	3, 269	1, 267	681
1911	109, 000	63, 943	16, 246		6, 170	4, 533	3, 634	717	637
1912	109, 000	63, 802	15, 778	6, 614	5, 842	4, 561	3, 413	1, 512	696
1913	113, 000	64, 555	15, 789	8, 051	6, 440	4, 994	3, 804	1, 404	715
1914	113, 000	61, 109	17, 909	9, 521	6, 339	4, 708	4, 439	1, 100	657
1915	124, 000	73, 315	17, 569	7, 921	6, 451	4, 786	4, 036	1, 289	804
1916	129, 000	78, 521	18, 363	6, 733	6, 409	5, 011	4, 377	1, 745	1, 135
1917	132, 000	80, 559	17, 143	6, 313	6, 742	5, 133	4, 261	2, 210	965
1918	105, 000	54, 466	17, 184	6, 302	6, 831	4, 642	4, 765	2, 085	1, 072
1919	123, 000	71, 734	19, 107	6, 532	7, 435	3, 114	3, 974	2, 243	1, 166
1920	117, 000	61, 949	19, 857	6, 284	6, 250	5, 868	4, 639	2, 560	1, 446
1921	127, 000	74, 240	17, 335	7, 931	5, 624	5, 806	4, 500	2, 681	1, 045
1922	133, 000	75, 495	19, 067	7, 629	6, 864	5, 954	4, 717	2, 703	1, 150
1923	118, 000	63, 164	17, 418	7, 206	6, 832	6, 034	4, 767	2, 566	937
1924	127, 000	69, 601	17, 960	7, 801	7, 076	6, 779	4, 153	2, 818	903
1925	127, 000	68, 851	18, 756	7, 951	6, 677	5, 752	4, 641	2, 949	925
1926	126, 000	66, 483	17, 465	8, 255	7, 108	7, 169	4, 807	3, 083	1, 159
1927 [4]	126, 000	63, 244	19, 510	8, 763	7, 331	6, 261	5, 435	3, 082	1, 244
1928 [4]	130, 000	70, 972	18, 944		7, 007		4, 245		1, 201
1929 [4]			18, 338		6, 569		4, 334		1, 117

Bureau of Agricultural Economics. The figures for each year include the crop harvested in the Northern Hemisphere within the calendar year and the following harvest in the Southern Hemisphere. Estimates of world rice production for the period 1900–1909 appear in Agriculture Yearbook, 1924, p. 653.

[1] China is an important producing country, but official statistics are not available.
[2] Irrigated rice.
[3] Estimated figures obtained by multiplying acreage under rice as classified for revenue purposes up to 1912, and acreage as reported by the Department of Land and Agriculture from 1912 on by an average yield for the years 1920–1923, for which years official estimates have been published of acreage, yield, and total production.
[4] Preliminary.

Table 109.—*Rice, rough: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State	Yield per acre							Estimated price per bushel						
	Average 1918–1927	1924	1925	1926	1927	1928	1929	Average 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	[1] 49.1	50.0	75.0	61.0	25.0	40.0	35.0	[2] 120	140	140	110	90	90	95
South Carolina	[3] 21.7	14.0	16.0	17.0	------	------	------	[2] 126	140	125	120	------	------	------
Georgia	[3] 22.5	17.0	17.0	20.0	------	------	------	[2] 132	140	145	110	------	------	------
Mississippi	[3] 20.7	10.0	18.0	18.0	------	------	------	[2] 120	136	110	120	------	------	------
Arkansas	45.6	42.0	43.0	53.0	44.0	47.7	46.0	118	138	150	100	90	86	92
Louisiana	34.6	34.6	33.3	32.5	40.0	38.5	41.0	118	136	153	105	87	90	98
Texas	36.6	40.0	37.0	37.0	46.2	44.0	44.0	117	125	149	110	86	88	97
California	54.4	48.5	46.6	53.6	56.0	61.9	65.5	139	166	170	131	115	88	105
United States	39.1	38.2	37.5	40.4	44.2	44.3	45.0	121.0	138.5	153.8	109.6	92.9	88.5	97.8

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 7-year average. [2] 4-year average. [3] 9-year average.

Table 110.—*Rice, rough: Receipts at New Orleans, 1909–1928*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1909	46,004	52,219	35,185	19,112	12,556	24,583	13,812	10,170	5,661	13,239	10,545	1,428	244,514
1910	28,948	51,977	27,521	17,868	18,891	17,678	9,254	8,294	9,354	10,377	3,807	4,972	208,941
1911	18,470	37,853	37,781	31,091	13,203	21,995	17,439	4,652	953	627	83	3,235	187,382
1912	18,169	30,103	30,748	38,071	30,829	12,846	2,601	1,832	419	1,086	4,042	3,322	174,068
1913	33,577	25,420	18,910	31,763	23,714	24,147	17,166	7,301	7,957	4,253	1,728	1,223	197,159
1914	31,623	36,413	24,732	34,707	31,503	10,054	14,046	6,277	759	579	1,640	1,376	193,709
1915	27,210	48,168	32,322	40,948	14,217	20,335	11,830	13,744	7,639	1,850	234	158	218,655
1916	35,959	46,698	41,009	37,791	18,349	5,021	15,140	23,733	10,503	1,938	1,717	1,618	239,476
1917	26,057	41,326	40,425	28,849	9,662	5,531	9,528	21,534	9,081	4,917	305	733	197,948
1918	20,719	55,998	26,574	16,157	12,440	14,944	14,503	8,270	8,842	7,770	3,786	2,709	192,712
1919	18,766	43,507	33,548	18,097	24,829	20,983	9,820	7,459	8,440	7,255	8,838	5,339	206,881
1920	27,889	40,123	45,620	33,881	21,366	18,338	8,253	23,160	20,417	36,841	19,382	14,057	309,327
1921	35,893	28,138	23,169	13,598	31,345	16,987	16,463	37,710	13,859	3,926	3,397	2,653	227,138
1922	15,545	28,886	41,076	31,446	22,092	14,070	8,308	2,813	15,605	3,195	6,383	7,035	196,454
1923	7,008	16,021	19,400	19,015	17,523	14,069	5,163	6,294	1,549	995	109	120	107,266
1924	13,587	28,232	31,274	26,869	19,292	12,882	12,034	2,130	2,320	1,027	1,484	1,038	152,169
1925	20,910	20,840	14,115	12,790	22,898	19,758	11,077	6,442	6,009	2,774	1,238	1,828	140,679
1926	6,937	19,755	17,057	13,664	14,618	13,554	7,852	12,847	2,108	4,843	7,847	3,921	125,003
1927	23,399	14,604	19,357	7,213	7,299	3,447	3,217	2,421	1,168	561	38	------	82,724
1928	4,172	7,847	13,234	8,910	5,162	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Converted from figures on 162-pound sacks as published in annual report of New Orleans Board of Trade.

Table 111.—*Rice, rough:*[1] *Wholesale price per 100 pounds, New Orleans, 1909–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	2.16	1.84	1.73	1.70	1.62	1.88	1.70	1.54	1.79	1.77	1.57	2.41	1.81
1910	1.73	1.41	1.41	1.46	1.50	1.54	1.42	1.52	1.33	1.45	1.39	1.70	1.49
1911	1.74	1.54	1.65	1.72	1.64	1.80	2.04	2.17	2.42	2.36	2.19	2.64	1.99
1912	2.21	2.09	1.64	1.98	2.09	2.18	2.22	2.16	1.82	2.23	2.01	2.11	2.03
1913	2.31	2.10	1.95	2.47	1.70	1.91	1.67	1.36	1.62	1.93	1.90	2.09	1.92
1914	2.67	2.41	1.64	1.70	2.09	1.96	2.22	2.27	2.31	2.20	2.19	2.09	2.15
1915	1.98	1.77	1.64	1.93	1.74	1.72	2.07	2.20	2.23	1.69	------	1.91	------
1916	2.41	1.89	1.96	2.12	2.04	2.05	2.18	2.30	3.09	3.91	3.40	3.95	2.61
1917	4.09	4.01	3.70	4.25	4.38	4.48	4.71	5.13	4.75	5.27	4.86	4.40	4.50
1918	4.44	4.32	3.86	3.78	3.86	3.63	------	------	------	4.56		[illegible]	
1919	8.02	5.86	5.17	5.23	5.17	6.49	------	------	5.94	5.48	6.10	------	------
1920	3.94	3.63	2.93	2.93	------	------	1.79	1.86	------	1.90	1.78	1.72	------
1921	2.17	2.23	2.21	2.00	------	2.54	2.21	2.48	2.07	1.99	2.25	2.48	------
1922	2.40	1.85	1.92	2.47	2.21	2.20	2.10	2.49	------	2.01	2.46	------	------
1923	2.74	2.44	2.40	2.58	2.64	2.48	2.49	2.85	2.99	2.62	------	------	------
1924	2.95	2.60	2.76	3.10	3.78	3.58	------	------	3.42	3.09	3.67	3.67	------
1925	3.42	2.80	2.78	2.91	3.28	3.07	2.77	2.78	2.78	3.14	2.93	------	------
1926	------	2.47	2.17	2.12	------	2.31	1.79	------	------	1.78	2.09		------
1927	2.16	2.19	2.42	------	2.16	------	2.07	------	------	------			
1928	2.28	2.28	1.96	2.21	------	------	------	------	2.35				
1929	------	------	1.74	2.03	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Converted from price per 162 pounds, published in annual reports of the New Orleans Board of Trade.

[1] Price is average of range of all rough rice reported; includes Honduras, Japan, and Blue Rose, 1909–1927; 1928 and 1929 is Blue Rose only.

TABLE 112.—*Rice, including flour, meal, and broken rice: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
British India	278	5,338	35	5,539	190	5,271	148	5,005	553	4,024
Siam [1]	0	1,929	0	2,975	0	2,906	0	3,820	0	--------
Indo-China	0	2,288	0	3,250	0	3,503	0	3,619	0	3,885
Italy	4	142	1	354	0	401	2	579	6	424
United States	210	16	68	67	117	117	48	310	37	379
Madagascar [2]	0	[2] 14	0	92	0	48	0	23	0	--------
Spain	5	18	1	100	0	142	[2] 0	[2] 117	--------	--------
Brazil	25	0	164	1	10	17	0	37	5	2
PRINCIPAL IMPORTING COUNTRIES										
China	705	0	1,685	5	2,493	4	2,812	12	--------	--------
British Malaya	[2] 2,000	[2] 1,299	1,461	554	1,696	629	1,887	660	1,805	620
Japan	656	62	1,714	29	768	14	1,300	12	618	9
Dutch East Indies	1,178	132	1,178	68	1,390	96	1,037	33	[3] 403	[3] 24
Ceylon	822	0	969	0	1,030	0	1,051	0	1,125	0
Germany	914	397	1,175	449	766	344	757	294	856	280
France	518	79	502	95	478	105	486	170	631	255
Cuba	262	0	424	0	477	0	436	0	--------	0
United Kingdom	769	91	294	19	244	18	267	17	272	12
Netherlands	779	476	296	234	330	285	262	203	225	187
Philippine Islands	413	0	223	1	155	1	28	2	96	2
Mauritius	133	[4] 1	135	0	117	0	[2] 131	[2] 3	--------	--------
Argentina	93	6	149	1	127	0	154	0	--------	0
Russia	250	6	[2] 195	[2] 0	[2] 83	[2] 0	[2] 149	[2] 0	--------	0
Czechoslovakia	0	0	111	0	107	0	120	0	116	0
Belgium	181	100	85	3	83	4	100	4	102	3
Egypt	99	54	98	62	97	40	32	83	31	168
Austria	[5] 183	[5] 0	58	0	54	0	59	0	62	0
Canada	32	2	45	2	39	2	43	1	47	0
Hungary	0	0	32	1	12	4	7	5	5	3
Total, 28 countries	10,509	12,450	11,098	13,901	10,863	13,951	11,316	15,009	6,995	10,277

Bureau of Agricultural Economics. Official sources except where otherwise noted. Mostly cleaned rice, Under rice is included paddy, unhulled, rough, cleaned, polished, broken, and cargo rice, in addition to rice flour and meal. Rice bran is not included. Rough rice, or paddy, where specifically reported, has been reduced to terms of cleaned rice at the ratio of 162 pounds of rough or unhulled to 100 pounds of cleaned. "Rice, other than whole or cleaned rice," in the returns of the United Kingdom is not considered paddy, since the chief sources of supply indicate that it is practically all hulled rice. Cargo rice, a mixture of hulled and unhulled, is included without being reduced to terms of cleaned. Broken rice and rice flour and meal, are taken without being reduced to terms of whole cleaned rice.

[1] Fiscal year Apr. 1–Mar. 31.
[2] International Yearbook of Agricultural Statistics.
[3] Java and Madura only.
[4] 2-year average.
[5] Average for Austria-Hungary.

TABLE 113.—*Rice, Blue Rose, clean: Average wholesale price per 100 pounds, New Orleans, 1914–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914			3.62	3.06	3.16	3.56	3.75	3.50	4.10	4.06	3.47	3.88	
1915	3.88	3.38	3.06	2.87	2.97	2.75	3.06	3.38	3.56	3.68	3.81	3.40	3.32
1916	3.40	3.31	3.00	3.31	3.16	3.18	3.31	3.87	4.94	6.18	6.13	6.25	4.17
1917	4.75	6.81	6.32	6.56	5.94	6.41	6.64	7.56	8.19	8.94	8.90	8.94	7.15
1918	7.88	6.75	6.56	6.44	6.06	5.94	5.94	5.83	5.63	5.25	8.00	10.82	6.76
1919		9.00	8.44	8.44	9.25	9.81	10.19	10.38	10.12	9.50	9.19	8.00	
1920	7.25	6.25	5.38	4.62	3.44	3.00	2.50	2.38	2.25	2.40	2.56	3.06	3.76
1921	3.19	3.50	3.78	3.69	3.12	3.10	3.18	3.44	3.56	3.60	4.31	4.38	3.57
1922	4.10	4.25	3.62	3.82	4.00	4.06	3.94	3.91	4.00	3.56	3.75	3.94	3.91
1923	3.78	4.00	4.88	4.66	4.38	4.62	4.69	5.06	5.06	5.88	6.12	6.19	4.94
1924	5.88	5.69	5.12	5.50	6.10	6.30	6.50	6.38	6.34	6.50	6.81	6.88	6.17
1925	6.62	6.31	5.69	6.34	6.41	6.31	6.59	6.25	6.19	5.60	5.94	5.94	6.18
1926	4.94	5.62	4.81	4.44	4.38	4.50	4.19	4.34	4.06	4.12	4.52	4.22	4.51
1927	4.12	4.12	3.84	3.62	3.69	3.75	3.66	3.62	3.50	4.12	4.28	4.12	3.87
1928	4.12		3.91	3.81	3.94	4.12	3.88	3.88	3.88	3.75	3.81	3.94	
1929	4.25	3.72	3.78	3.88	3.84								

Bureau of Agricultural Economics. Compiled from annual reports of the New Orleans Board of Trade.

TABLE 114.—*Buckwheat: Acreage, production, value, exports, etc., United States, 1909–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Foreign trade, including flour, year beginning July 1 [1]		
						Domestic exports	Imports	Net balance [2]
	1,000 acres	*Bushels of 48 lbs.*	*1,000 bushels*	*Cents*	*1,000 dollars*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*878*	*16.9*	*14,849*					
1909	878	20.5	17,983	70.2	12,628	158	11	+147
1910	860	20.5	17,598	66.1	11,636		92	−92
1911	833	21.1	17,549	72.6	12,735		21	−21
1912	841	22.9	19,249	66.1	12,720	1	64	−63
1913	805	17.2	13,833	75.5	10,445	1	206	−205
1914	792	21.3	16,881	76.4	12,892	414	259	+155
1915	769	19.6	15,056	78.7	11,843	515	402	+113
1916	828	14.1	11,662	112.7	13,147	260	266	−6
1917	924	17.3	16,022	160.0	25,631	6	510	−504
1918	1,027	16.5	16,905	166.5	28,142	119	413	−294
1919	*743*	*17.1*	*12,690*					
1919	700	20.6	14,399	146.1	21,032	245	160	+85
1920	701	18.7	13,142	128.3	16,863	399	336	+63
1921	680	20.9	14,207	81.2	11,540	485	113	+372
1922	764	19.1	14,564	88.5	12,889	172	286	−114
1923	739	18.9	13,965	93.3	13,029	92	322	−230
1924	*717*	*16.8*	*12,004*					
1924	745	17.9	13,357	102.6	13,708	191	546	−355
1925	747	18.7	13,994	88.8	12,423	79	88	−9
1926	694	18.3	12,676	88.2	11,183	66	86	−20
1927	810	19.5	15,755	83.5	13,155	554	74	+480
1928	749	17.6	13,148	87.5	11,511	229	79	+150
1929 [3]	729	15.8	11,505	97.7	11,241			

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. See 1927 Yearbook, page 825, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce. Buckwheat and buckwheat flour imports for consumption, 1909–1929. Buckwheat flour converted to terms of grain on the basis that 1 barrel of flour is the product of 7 bushels of grain.

[2] The difference between total exports (domestic exports plus reexports) and total imports. Net exports indicated by +; net imports indicated by −.

[3] Preliminary.

TABLE 115.—*Buckwheat: Acreage harvested and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage harvested					Production				
	Average 1923–1927	1926	1927	1928	1929 [1]	Average 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	13	15	14	13	13	315	345	322	299	364
Vermont	3	3	2	2	2	61	69	52	48	50
New York	213	190	201	192	198	4, 216	3, 591	4, 221	3, 475	3, 168
New Jersey	4	2	1	1	2	77	36	21	20	36
Pennsylvania	207	190	210	195	199	4, 394	3, 610	4, 935	3, 802	3, 383
North Atlantic	441	400	428	403	414	9, 078	7, 651	9, 551	7, 644	7, 001
Ohio	26	22	28	35	38	490	385	588	700	673
Indiana	15	20	15	15	15	233	320	255	225	218
Illinois	6	5	6	5	5	81	65	97	70	75
Michigan	52	50	53	48	45	724	765	689	720	405
Wisconsin	25	23	23	25	21	376	345	382	412	304
Minnesota	72	66	126	88	70	1, 012	1, 122	1, 764	1, 074	812
Iowa	7	5	15	6	6	108	90	195	87	81
Missouri	1	1	1	1	1	15	15	20	13	15
North Dakota	[2] 8	9	11	10	5	[2] 108	135	160	145	30
South Dakota	11	9	18	19	16	162	126	279	276	152
Nebraska	1	1	1	1	1	15	11	15	10	11
North Central	223	211	297	253	223	3, 302	3, 379	4, 444	3, 732	2, 776
Delaware	4	2	2	2	2	62	32	37	34	36
Maryland	8	8	8	7	7	166	162	176	133	126
Virginia	16	16	14	17	15	305	352	294	326	292
West Virginia	35	36	39	40	40	668	684	858	800	760
North Carolina	10	10	10	10	11	188	220	200	190	220
South Atlantic	72	72	73	76	75	1, 390	1, 450	1, 565	1, 483	1, 434
Kentucky	8	8	9	14	14	126	136	144	238	252
Tennessee	3	3	3	3	3	54	60	51	51	42
South Central	11	11	12	17	17	180	196	195	289	294
United States	747	694	810	749	729	13, 949	12, 676	15, 755	13, 148	11, 505

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary. [2] 4-year average.

TABLE 116.—*Buckwheat: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State and division	Yield per acre: Av., 1918–1927	1924	1925	1926	1927	1928	1929	Estimated price per bushel: Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	24.4	24.0	26.0	23.0	23.0	23.0	28.0	93	95	100	83	90	90	90
Vermont	22.1	22.0	22.0	23.0	26.0	24.0	25.0	95	105	90	85	96	105	110
New York	19.8	21.0	19.0	18.9	21.0	18.1	16.0	91	101	86	89	84	90	100
New Jersey	19.7	19.0	21.0	18.0	21.0	20.0	18.0	99	117	100	100	84	92	105
Pennsylvania	20.8	19.0	23.0	19.0	23.5	19.5	17.0	92	103	91	89	85	89	100
North Atlantic	20.4	20.1	21.0	19.1	22.3	19.0	16.9	91.6	101.8	89.0	88.7	84.8	89.6	99.6
Ohio	19.9	16.0	19.7	17.5	21.0	20.0	17.7	93	103	86	95	86	87	92
Indiana	16.3	14.0	13.2	16.0	17.0	15.0	14.5	93	103	85	95	85	85	95
Illinois	15.7	14.0	14.0	13.0	16.2	14.0	15.0	100	120	100	92	85	90	98
Michigan	13.8	14.0	13.7	15.3	13.0	15.0	9.0	86	96	90	80	80	79	85
Wisconsin	15.2	13.0	16.0	15.0	16.6	16.5	14.5	88	103	79	87	82	83	93
Minnesota	15.2	12.0	14.0	17.0	14.0	12.2	11.6	82	102	75	75	70	76	84
Iowa	15.4	15.0	17.5	18.0	13.0	14.5	13.5	91	103	90	82	85	90	95
Missouri	14.6	13.0	14.0	15.0	20.0	13.0	15.0	98	105	90	85	90	95	100
North Dakota	[1] 12.4	8.0	12.0	15.0	14.5	14.5	6.0	[1] 66	60	60	80	64	68	73
South Dakota	14.4	14.8	12.0	14.0	15.5	14.5	9.5	81	107	70	80	64	67	74
Nebraska	15.1	15.0	14.0	11.0	15.3	9.6	11.2	92	100	100	90	85	85	85
North Central	15.3	13.5	14.7	16.0	15.0	14.8	12.4	86.2	100.8	82.0	82.6	76.1	79.6	88.0
Delaware	17.5	16.8	16.0	16.0	18.5	17.0	18.0	94	102	92	90	95	95	100
Maryland	20.9	18.0	24.0	20.2	22.0	19.0	18.0	101	110	100	100	93	95	100
Virginia	19.8	17.3	16.0	22.0	21.0	19.2	19.5	100	106	110	95	93	95	99
West Virginia	19.9	17.0	18.0	19.0	22.0	20.0	19.0	101	112	100	100	97	97	110
North Carolina	19.0	18.0	14.0	22.0	20.0	19.0	20.0	107	119	110	100	100	100	107
South Atlantic	19.7	17.3	17.5	20.1	21.4	19.5	19.1	101.2	111.0	102.8	98.6	96.1	96.7	106.1
Kentucky	15.6	14.0	12.5	17.0	16.0	17.0	18.0	98	119	100	84	86	86	102
Tennessee	17.2	19.0	15.0	20.0	17.0	17.0	14.0	108	125	115	100	90	100	110
South Central	16.4	15.5	13.3	17.8	16.2	17.0	17.3	101.0	121.3	105.3	88.8	87.2	88.6	103.1
United States	18.9	17.9	18.7	18.3	19.5	17.6	15.8	91.3	102.6	88.8	88.2	83.5	87.5	97.7

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 4-year average.

TABLE 117.—*Buckwheat: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning September	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	76.0	73.3	70.8	70.0	71.0	71.3	72.0	72.2	72.4	75.8	76.4	73.7	72.1
1910	72.0	68.6	66.0	66.0	65.1	64.2	64.7	65.6	68.0	71.2	74.2	75.0	67.5
1911	71.8	71.3	72.8	73.2	73.6	75.2	76.9	78.4	82.4	85.5	84.9	80.1	75.4
1912	73.2	67.6	65.8	66.4	68.1	68.2	67.6	69.8	71.1	71.8	72.6	71.2	68.3
1913	72.0	74.8	75.5	76.0	76.1	75.4	76.0	77.1	78.2	82.2	83.4	80.5	76.6
1914	79.2	78.4	77.2	77.2	80.8	84.6	85.4	85.0	85.8	89.5	90.6	85.3	81.1
1915	77.6	76.1	78.6	80.1	81.1	82.0	83.2	84.0	86.0	90.0	91.0	87.7	81.5
1916	88.4	96.6	107.8	115.0	115.9	119.7	126.6	139.4	167.2	196.4	199.2	176.8	126.5
1917	159.4	154.3	157.1	161.4	162.3	165.0	169.2	173.0	183.5	195.9	196.8	191.5	167.1
1918	185.2	176.5	169.8	164.7	160.5	153.2	149.0	148.4	156.4	163.2	163.4	162.8	164.7
1919	160.9	156.5	148.6	148.4	152.8	155.3	159.4	166.0	174.5	191.4	192.0	178.8	159.2
1920	167.8	145.2	129.6	126.8	122.0	117.5	112.8	112.6	116.0	115.7	117.5	117.0	126.8
1921	110.2	95.0	82.6	82.4	84.4	85.6	89.2	93.0	95.4	100.0	99.2	91.0	89.1
1922	85.2	82.2	84.4	89.0	88.5	88.6	92.6	95.0	98.4	102.3	101.4	99.4	89.9
1923	96.6	94.2	93.4	94.7	92.7	92.5	94.7	93.6	97.0	96.5	104.5	123.9	96.3
1924	118.8	107.1	106.8	104.6	107.0	112.2	112.4	104.1	113.3	112.3	115.7	110.0	108.6
1925	101.2	87.6	86.7	87.9	85.7	80.9	81.7	82.5	85.0	90.1	89.9	93.7	87.5
1926	90.4	86.5	83.6	83.5	83.6	84.6	86.0	85.1	88.1	98.8	101.0	98.1	87.0
1927	92.3	82.9	79.4	81.0	82.0	85.2	90.2	94.8	102.3	109.0	108.0	98.1	87.6
1928	92.6	84.5	84.8	88.7	91.2	94.3	94.1	96.4	96.5	94.7	100.4	99.6	90.7
1929	96.6	95.8	95.6	95.9									

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of buckwheat for each State; yearly price obtained by weighting monthly prices by average monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, September, 1909–December, 1923.

Table 118.—*Sorghums for grain, forage, and all purposes:* [1] *Acreage, production, value, United States, 1919–1929*

Year	For grain			For forage			For all purposes			Price per bushel received by producers Dec. 1 [2]	Farm value Dec. 1
	Acreage	Yield per acre	Production	Acreage	Yield per acre	Production	Acreage	Equivalent yield per acre	Equivalent production on total acreage		
	1,000 acres	*Bushels*	*1,000 bushels*	*1,000 acres*	*Tons*	*1,000 tons*	*1,000 acres*	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*
1919	3, 775	28. 0	105, 858	2, 666	2. 10	5, 603	6, 441	24. 5	157, 805	128. 1	202, 094
1920	4, 232	28. 6	120, 848	2, 562	2. 16	5, 539	6, 794	25. 7	174, 790	93. 7	163, 860
1921	3, 920	25. 9	101, 506	2, 465	1. 99	4, 900	6, 385	23. 1	147, 609	39. 0	57, 576
1922	3, 566	19. 1	68, 154	2, 212	1. 63	3, 601	5, 778	17. 0	98, 158	88. 1	86, 517
1923	4, 403	19. 2	84, 505	2, 258	1. 72	3, 895	6, 661	17. 4	116, 109	95. 0	110, 258
1924	3, 778	21. 1	79, 890	2, 311	1. 80	4, 157	6, 089	19. 2	117, 057	85. 2	99, 765
1925	4, 076	18. 3	74, 467	2, 564	1. 61	4, 118	6, 640	16. 0	106, 434	75. 4	80, 251
1926	4, 367	22. 9	100, 044	2, 323	1. 75	4, 061	6, 690	20. 6	137, 515	53. 9	74, 065
1927	4, 394	22. 8	100, 364	2, 329	2. 06	4, 800	6, 723	20. 4	137, 358	61. 6	84, 614
1928	4, 311	23. 0	99, 282	2, 186	2. 16	4, 718	6, 497	21. 9	142, 513	62. 0	88, 429
1929 [3]	3, 403	18. 7	63, 484	2, 518	1. 81	4, 560	5, 921	17. 0	100, 845	71. 0	71, 617

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Kafirs, milo, feterita, durra, etc.
[2] From 1919 to 1924, Nov. 15 price.
[3] Preliminary.

Table 119.—*Sorghums:* [1] *Acreage and production, by States, average 1923–1927, annual 1926–1929*

State	Acreage for all purposes					Production for all purposes				
	Average, 1923–1927	1926	1927	1928	1929 [2]	Average, 1923–1927	1926	1927	1928	1929 [2]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Missouri	88	94	113	99	89	1, 649	1, 692	2, 712	2, 178	1, 513
Nebraska	25	22	30	24	22	471	233	705	485	376
Kansas	1, 474	1, 345	1, 547	1, 284	1, 091	25, 943	20, 175	32, 487	28, 633	19, 638
Oklahoma	1, 723	1, 817	1, 744	1, 709	1, 384	27, 754	34, 523	34, 880	30, 762	20, 483
Texas	2, 633	2, 854	2, 654	2, 760	2, 760	55, 897	71, 350	55, 734	69, 000	46, 920
Colorado	262	227	284	256	205	2, 861	1, 135	2, 840	2, 688	2, 255
New Mexico	204	195	171	188	203	3, 645	4, 095	2, 394	3, 384	4, 466
Arizona	46	40	50	52	52	1, 246	1, 240	1, 550	1, 508	1, 560
California	107	96	130	125	115	3, 427	3, 072	4, 056	3, 875	3, 634
United States	6, 561	6, 690	6, 723	6, 497	5, 921	122, 895	137, 515	137, 358	142, 513	100, 845

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

Kafirs, milo, feterita, durra, etc. [2]Preliminary.

TABLE 120.—*Sorghums:*[1] *Yield per acre and estimated price per bushel, December 1, by States, averages, and annual 1924–1929*

State	Yield per acre							Estimated price per bushel						
	Average, 1919–1927	1924	1925	1926	1927	1928	1929	Average, 1923–1927	1924[2]	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	21.0	15.0	15.0	18.0	24.0	22.0	17.0	94	115	100	80	75	80	100
Nebraska	19.2	18.0	15.0	10.6	23.5	20.2	17.1	83	91	75	80	80	85	100
Kansas	18.7	18.8	16.0	15.0	21.0	22.3	18.0	71	80	71	60	60	61	70
Oklahoma	17.4	18.0	12.5	19.0	20.0	18.0	14.8	68	77	75	45	50	62	65
Texas	23.7	21.0	18.0	25.0	21.0	25.0	17.0	78	87	76	55	65	60	70
Colorado	12.2	8.0	11.0	5.0	10.0	10.5	11.0	73	90	71	60	65	60	80
New Mexico	18.7	20.0	18.0	21.0	14.0	18.0	22.0	75	100	65	40	80	60	65
Arizona	26.7	18.0	20.0	31.0	31.0	29.0	30.0	86	130	66	60	75	80	95
California	30.7	30.5	34.0	32.0	31.2	31.0	31.6	105	135	107	84	97	90	100
United States	20.4	19.2	16.0	20.6	20.4	21.9	17.0	76.5	85.2	75.4	53.9	61.6	62.0	71.0

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Kafirs, milo, feterita, durra, etc. [2] Nov. 15 price.

TABLE 121.—*Grain sorghums:*[1] *Receipts at Kansas City, by months, 1909–1928*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1909	106	50	125	150	161	45	32	20	12	8	5	4	718
1910	107	287	224	179	86	52	71	56	30	42	19	62	1,215
1911	202	323	255	410	191	198	186	121	75	46	62	103	2,172
1912	446	645	610	333	111	151	129	223	90	11	33	26	2,808
1913	22	53	133	72	25	15	16	15	3	1	9	42	406
1914	311	719	661	618	189	486	252	186	206	204	112	130	4,074
1915	367	1,116	1,200	936	866	682	625	256	202	104	85	24	6,463
1916	79	199	192	274	72	45	38	9	8	8	6	6	936
1917	88	278	464	385	506	322	98	107	40	29	9	7	2,333
1918	51	163	153	168	384	329	375	95	160	65	87	80	2,110
1919	22	233	745	721	741	449	540	817	768	235	160	123	5,554
1920	112	654	980	463	569	287	301	644	234	293	120	209	4,866
1921	263	350	471	537	392	312	199	212	150	84	35	120	3,125
1922	168	444	420	233	169	139	76	50	69	35	19	18	1,840
1923	195	350	465	579	398	340	274	262	250	106	63	103	3,385
1924	647	1,152	683	636	497	320	301	440	221	183	68	24	5,172
1925	279	629	416	290	261	211	290	469	162	94	136	97	3,334
1926	297	493	626	442	293	216	192	241	249	285	79	112	3,625
1927	410	905	696	519	592	392	323	343	224	87	51	236	4,778
1928	449	675											

Bureau of Agricultural Economics. Compiled from annual statistical reports of Kansas City Board of Trade.

[1] Includes kafir corn, milo maize, and feterita. Quoted as kafir in Table 117, 1927 Yearbook.

TABLE 122.—*Grain sorghums: Classification of receipts graded by licensed inspectors, all inspection points*

TOTAL OF ALL CLASSES AND SUBCLASSES UNDER EACH GRADE, 1925–1928; BY GRADE AND CLASS, 1928–29

Year and class	Receipts of—					
	No. 1	No. 2	No. 3	No. 4	Sample grade	Total
Beginning July—	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1925	312	4, 158	5, 796	1, 639	495	12, 400
1926	878	7, 180	6, 674	1, 792	691	17, 215
1927	1, 175	9, 885	8, 125	3, 143	965	23, 293
1928	866	7, 247	5, 400	6, 794	3, 969	24, 276

TOTAL INSPECTIONS, BY GRADE AND CLASS, JULY 1, 1928, TO JUNE 30, 1929

Year and class	No. 1	No. 2	No. 3	No. 4	Sample grade	Total
Kafir	466	4, 138	2, 138	2, 607	1, 604	10, 953
Milo	357	2, 461	2, 450	2, 715	1, 597	9, 580
Durra	5	1	2	0	0	8
Feterita	5	8	4	7	4	28
Darso	3	5	10	9	16	43
Freed sorgo	0	2	9	9	1	21
Brown kaoliang	0	0	0	0	0	0
White hegari	0	0	0	0	0	0
Schrock kafir	0	1	0	5	0	6
Shallu	1	0	0	0	0	1
Mixed	29	631	787	1, 442	747	3, 636

Bureau of Agricultural Economics.

TABLE 123.—*Kafir, No. 2 White: Weighted average price*[1] *per bushel of reported cash sales, Kansas City, 1909–1929*

Year beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	67	73	86	80	77	74	82	84	86	101	100	67	81
1910	63	54	54	52	53	53	59	69	80	75	71	68	63
1911	59	55	67	(2)	72	80	81	70	91	94	76	63	73
1912	55	48	48	46	45	46	49	62	61	79	86	85	59
1913	88	91	96	96	99	(2)	112	(2)	(2)	(2)	(2)	(2)	------
1914	58	64	74	77	72	66	64	67	65	61	58	59	66
1915	51	55	55	54	52	59	59	62	68	88	96	103	67
1916	131	118	136	139	149	178	212	188	224	251	243	207	181
1917	190	182	186	207	215	189	164	148	170	190	190	183	184
1918	166	146	146	151	143	150	166	192	197	202	135	131	160
1919	150	164	139	122	129	133	148	141	132	136	125	101	135
1920	78	66	55	51	48	45	58	63	68	63	63	57	59
1921	48	50	50	72	74	67	72	77	93	96	111	102	76
1922	100	91	89	90	93	96	99	94	84	83	(2)	(2)	------
1923	(2)	71	(2)	68	67	73	62	85	94	(2)	113	89	------
1924	88	98	109	103	93	92	97	105	113	116	107	100	101
1925	82	77	77	72	68	70	69	70	79	76	74	71	73
1925	64	64	63	63	65	69	79	102	110	97	(2)	70	------
1927	69	71	74	81	88	90	92	91	92	83	89	83	82
1928	78	74	75	80	71	71	71	74	89	90	105	81	77
1929	77	73	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Kansas City Grain Market Review, formerly Daily Price Current. Quoted per 100 pounds; converted to bushels of 56 pounds.

[1] Average of daily prices weighted by car-lot sales. [2] No quotations.

COTTON, SUGAR, AND TOBACCO

TABLE 124.—*Cotton: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1929*

Year	Acreage harvested	Average yield per acre	Production [1]	Price per pound received by producers, Dec. 1	Farm value Dec. 1	Average price per pound, New York [2]	Domestic exports, year beginning Aug. 1 [3,4,5]	Imports, year beginning Aug. 1 [4,6]	Net exports, year beginning Aug. 1 [3,4,5,7]
	1,000 acres	*Lbs.*	*1,000 bales*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1849			*2,469*			12.34	[8] 1,271	[8] 1	[8] 1,270
1859			*5,387*			11.00	[8] 3,535	[8, 9] 4	[8] 3,531
1866	7,599	129.0	1,750			31.59	[8] 1,323	[8] 2	[8] 1,324
1867	7,828	189.8	2,340			24.85	1,511	2	1,510
1868	6,799	192.2	2,380			29.01	1,288	[9] 6	1,284
1869			*3,012*			23.98			
1869	7,743	196.9	*3,012*			23.98	1,980	4	1,977
1870	8,885	198.9	3,800			16.95	2,894	3	2,893
1871	7,558	148.2	2,553			20.48	1,851	7	1,844
1872	8,483	188.7	3,920			18.15	2,437	11	2,426
1873	9,510	179.7	3,683			17.00	2,706	5	2,702
1874	11,764	147.5	3,941			15.00	2,523	5	2,520
1875	11,934	190.6	5,123			13.00	3,003	5	2,999
1876	11,677	167.8	4,438	9.0	174,724	11.73	2,869	6	2,864
1877	12,133	163.8	4,370			11.28	3,198	7	3,194
1878	12,344	191.2	5,244	8.2	192,515	10.83	3,265	6	3,259
1879	*14,480*	181.0	*5,755*	10.3	269,305	12.02	3,711	7	3,705
1880	15,951	184.5	6,343	9.8	289,083	11.34	4,409	9	4,403
1881	16,711	149.8	5,456			12.16	3,430	9	3,426
1882	16,277	185.7	6,957	9.1	275,513	10.63	4,582	9	4,577
1883	16,778	164.8	5,701	9.1	250,977	10.64	3,745	15	3,734
1884	17,440	153.8	5,682	9.2	246,575	10.54	3,740	10	3,733
1885	18,301	164.4	6,575	8.4	251,775	9.44	4,193	11	4,185
1886	18,455	169.5	6,446	8.1	251,856	10.25	4,274	9	4,266
1887	18,641	182.7	7,020	8.5	290,901	10.27	4,557	11	4,547
1888	19,059	180.4	6,941	8.5	292,139	10.71	4,720	17	4,704
1889	*20,175*	159.7	*7,473*	8.5	275,249	11.27	4,934	19	4,915
1890	19,512	187.0	8,674	8.6	313,360	9.48	5,859	45	5,815
1891	19,059	179.4	9,018	7.2	247,633	7.68	5,888	61	5,827
1892	15,911	209.2	6,664	8.3	277,194	8.45	4,456	90	4,367
1893	19,525	149.9	7,493	7.0	204,983	7.75	5,309	58	5,253
1894	23,688	195.3	9,476	4.6	212,335	6.38	7,010	104	6,908
1895	20,185	155.6	7,161	7.6	238,503	8.10	4,710	115	4,598
1896	23,273	184.9	8,533	6.7	286,169	7.71	6,172	119	6,055
1897	24,320	182.7	10,898	6.7	296,816	6.40	7,757	102	7,656
1898	24,967	220.6	11,189	5.7	315,449	6.00	7,662	105	7,557
1899	*24,275*		*9,345*						
1899	24,327	183.8	*9,345*	7.0	326,215	8.36	6,228	140	6,091
1900	24,933	194.4	*10,123*	9.2	463,310	9.38	6,800	109	6,692
1901	26,774	170.0	*9,510*	7.0	334,088	8.73	6,949	202	6,750
1902	27,175	187.3	*10,631*	7.6	403,718	9.96	7,084	151	6,936
1903	27,052	174.3	*9,851*	10.5	516,763	12.84	6,207	103	6,107
1904	31,215	205.9	*13,438*	9.0	603,138	9.09	8,908	129	8,781
1905	27,110	186.6	*10,575*	10.8	569,791	11.30	7,118	144	6,980
1906	31,374	202.5	*13,274*	9.6	635,534	11.24	8,943	227	8,741
1907	29,660	179.1	*11,107*	10.4	575,226	11.53	7,666	153	7,518
1908	32,444	194.9	*13,242*	8.7	575,092	10.23	8,955	181	8,778
1909	*32,044*		*10,005*						
1909	30,938	154.3	*10,005*	13.9	697,681	14.66	6,353	170	6,194

1 500-pound gross weight bales, from 1899–1927.

2 Compiled from Cotton Fluctuation, 1849–1888, and are averages for crop year beginning September. From New York Commercial and Financial Chronicle, 1889–1899, and from reports of New York Cotton Exchange since 1900. Since 1889 the averages are for crop year beginning August.

3 Excluding linters from 1914 to 1929.

4 Compiled from Commerce and Navigation of the United States, 1849–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June and July, 1919–1929, and January 1927 and 1929.

5 Bales of 500 pounds gross weight.

6 Bales of 478 pounds net, which are equivalent to bales of 500 pounds gross weight.

7 Total exports (domestic plus foreign) minus imports.

8 Year beginning July 1.

9 Estimated from value of imports. Average import price per pound calculated by assuming that the percentage change in import price from the previous year is equal to the percentage change in the export prices.

TABLE 124.—*Cotton: Acreage, production, value, exports, etc., United States, 1849, 1859, 1866–1929*—Continued

Year	Acreage harvested	Average yield per acre	Production	Price per pound received by producers, Dec. 1	Farm value Dec. 1	Average price per pound, New York	Domestic exports, year beginning Aug. 1	Imports, year beginning Aug. 1	Net exports, year beginning Aug. 1
	1,000 acres	*Lbs.*	*1,000 bales*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1910	32, 403	170. 7	*11, 609*	14. 1	820, 407	14. 87	8, 027	245	7, 787
1911	36, 045	207. 7	*15, 693*	8. 8	687, 888	10. 85	11, 116	233	10, 885
1912	34, 283	190. 9	*13, 703*	11. 9	817, 055	12. 29	9, 146	249	8, 899
1913	37, 089	182. 0	*14, 156*	12. 2	862, 708	13. 21	9, 508	273	9, 251
1914	36, 832	209. 2	*16, 135*	6. 8	549, 036	[10] 8. 89	8, 702	400	8, 322
1915	31, 412	170. 3	*11, 192*	11. 3	631, 460	11. 98	6, 113	458	5, 673
1916	34, 985	156. 6	*11, 450*	19. 6	1, 122, 295	19. 28	5, 525	311	5, 219
1917	33, 841	159. 7	*11, 302*	27. 7	1, 566, 198	29. 68	4, 402	231	4, 175
1918	36, 008	159. 6	*12, 041*	27. 6	1, 663, 633	31. 01	5, 774	211	5, 568
1919	*33, 740*		*11, 421*						
1919	33, 566	161. 5	*11, 421*	35. 6	2, 034, 658	38. 29	6, 707	732	5, 993
1920	35, 878	178. 4	*13, 440*	13. 9	933, 658	17. 89	5, 973	237	5, 753
1921	30, 509	124. 5	*7, 954*	16. 2	643, 933	18. 92	6, 348	380	5, 980
1922	33, 036	141. 2	[11] *9, 755*	23. 8	1, 160, 968	26. 24	5, 007	492	4, 536
1923	37, 123	130. 6	*10, 140*	31. 0	1, 571, 829	31. 11	5, 815	306	5, 530
1924	*39, 304*		*13, 628*						
1924	41, 360	157. 4	*13, 628*	22. 6	1, 540, 884	24. 74	8, 240	328	7, 923
1925	46, 053	167. 2	*16, 104*	18. 2	1, 464, 032	20. 53	8, 267	340	7, 939
1926	47, 087	182. 6	*17, 977*	10. 9	982, 736	15. 15	11, 299	419	10, 900
1927	40, 138	154. 5	12, 955	19. 6	1, 269, 885	20. 42	7, 859	354	7, 524
1928	45, 341	152. 9	14, 478	18. 0	1, 301, 796	19. 73	8, 419	479	7, 957
1929 [12]	45, 981	155. 3	14, 919	16. 4	1, 225, 032				

Bureau of Agricultural Economics; italic figures are census returns; other acreage, yield, and production figures are estimates by the crop-reporting board; acreage revised on census basis.

[10] Average for nine months only. Exchange closed August–Nov. 17, on account of war.
[11] Cotton ginned in the United States. Prior census reports include undetermined quantities Lower California cotton ginned in the United States. In later years no Lower California cotton ginned in the United States.
[12] Preliminary.

TABLE 125.—*Cotton: Acreage in cultivation and acreage abandoned, by States, averages, and annual 1924–1929*

State	Acreage in cultivation June 25							Acreage abandoned after June 25						
	Average, 1923–1927	1924	1925	1926	1927	1928 [1]	1929 [1 2]	Average, 1918–1927	1924	1925	1926	1927	1928 [3]	1929 [3]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Missouri	447	524	542	472	305	355	350	5. 0	6. 0	4. 0	8. 0	4. 5	6. 0	2. 0
Virginia	88	107	101	95	65	81	89	2. 1	4. 7	1. 0	2. 0	2. 0	2. 0	1. 3
North Carolina	1, 917	2, 099	2, 037	2, 015	1, 749	1, 892	1, 818	1. 6	4. 5	1. 0	1. 5	1. 2	1. 7	2. 0
South Carolina	2, 475	2, 491	2, 708	2, 716	2, 454	2, 485	2, 228	2. 3	3. 5	2. 0	2. 5	4. 0	5. 0	2. 0
Georgia	3, 626	3, 099	3, 662	4, 025	3, 501	3, 883	3, 847	3. 6	1. 7	2. 0	1. 5	2. 5	4. 0	1. 7
Florida	106	82	103	108	67	101	97	5. 5	3. 0	1. 5	3. 0	4. 0	6. 0	1. 8
Tennessee	1, 118	1, 016	1, 191	1, 178	985	1, 145	1, 137	2. 4	2. 0	1. 5	3. 0	2. 0	3. 3	1. 5
Alabama	3, 351	3, 114	3, 539	3, 699	3, 214	3, 643	3, 633	1. 8	1. 9	1. 0	1. 3	1. 5	3. 0	1. 2
Mississippi	3, 433	3, 057	3, 501	3, 809	3, 408	4, 154	4, 133	2. 8	2. 5	1. 0	1. 5	2. 0	3. 0	1. 5
Arkansas	3, 423	3, 173	3, 814	3, 867	3, 142	3, 834	3, 900	2. 4	2. 5	2. 0	2. 0	3. 0	4. 0	1. 7
Louisiana	1, 727	1, 666	1, 903	2, 019	1, 585	2, 052	2, 079	3. 5	3. 0	1. 5	2. 0	2. 7	3. 0	1. 4
Oklahoma	4, 402	4, 022	5, 320	5, 083	4, 187	4, 420	4, 655	6. 9	4. 0	2. 0	8. 0	14. 0	4. 0	3. 5
Texas	17, 455	17, 706	19, 139	19, 140	16, 850	18, 330	18, 912	4. 2	3. 0	8. 0	4. 0	4. 0	3. 2	5. 5
New Mexico	112	126	138	125	100	123	132	[4] 13. 2	20. 0	23. 0	4. 0	5. 0	5. 0	1. 5
Arizona	157	183	162	168	140	202	227	2. 4	1. 6	0	0. 6	0. 7	1. 0	0. 5
California	137	130	171	167	130	223	317	2. 2	0	1. 0	3. 0	1. 5	2. 2	2. 5
All other	37	46	59	44	23	23	15		10. 8	3. 4	2. 3	5. 0	5. 0	0
United States	44, 013	42, 641	48, 090	48, 730	41, 905	46, 946	47, 569	3. 6	3. 0	4. 2	3. 4	4. 2	3. 4	3. 3

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] In cultivation July 1. [2] Preliminary. [3] Abandoned after July 1. [4] 5-year average.

TABLE 126.—*Cotton: Acreage harvested, by States, 1917–1929*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Missouri	153	148	125	136	103	198	355	493	520	434	291	334	343
Virginia	50	44	42	42	34	55	74	102	100	93	64	79	88
North Carolina	1, 515	1, 600	1, 490	1, 587	1, 403	1, 625	1, 679	2, 005	2, 017	1, 985	1, 728	1, 860	1, 782
South Carolina	2, 837	3, 001	2, 835	2, 964	2, 571	1, 912	1, 965	2, 404	2, 654	2, 648	2, 356	2, 361	2, 183
Georgia	5, 195	5, 341	5, 220	4, 900	4, 172	3, 418	3, 421	3, 046	3, 589	3, 965	3, 413	3, 728	3, 782
Florida	183	167	103	100	65	118	147	80	101	105	64	95	95
Tennessee	882	902	758	840	634	985	1, 172	996	1, 173	1, 143	965	1, 107	1, 120
Alabama	1, 977	2, 570	2, 791	2, 858	2, 235	2, 771	3, 079	3, 055	3, 504	3, 651	3, 166	3, 534	3, 589
Mississippi	2, 788	3, 138	2, 848	2, 950	2, 628	3, 014	3, 170	2, 981	3, 466	3, 752	3, 340	4, 029	4, 071
Arkansas	2, 740	2, 991	2, 725	2, 980	2, 382	2, 799	3, 026	3, 094	3, 738	3, 790	3, 048	3, 681	3, 834
Louisiana	1, 454	1, 683	1, 527	1, 470	1, 168	1, 140	1, 405	1, 616	1, 874	1, 979	1, 542	1, 990	2, 050
Oklahoma	2, 783	2, 998	2, 424	2, 749	2, 206	2, 915	3, 197	3, 861	5, 214	4, 676	3, 601	4, 243	4, 492
Texas	11, 092	11, 233	10, 476	11, 898	10, 745	11, 874	14, 150	17, 175	17, 608	18, 374	16, 176	17, 743	17, 872
New Mexico	------	------	------	------	------	28	60	101	107	120	95	117	130
Arizona	41	95	107	230	90	101	127	180	162	167	139	200	226
California	136	85	85	150	55	67	83	130	169	162	128	218	309
All other	15	12	10	24	18	16	13	41	57	43	22	22	15
United States	33, 841	36, 008	33, 566	35, 878	30, 509	33, 036	37, 123	41, 360	46, 053	47, 087	40, 138	45, 341	45, 981
Lower California (old Mexico)	------	88	100	125	85	135	150	137	150	130	110	160	147

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 127.—*Cotton: Yield per acre and estimated price per pound, December 1, by States, averages and annual 1924–1929*

State	Yield per acre							Estimated price per pound						
	Av. 1918–1927	1924	1925	1926	1927	1928	1929	Av. 1923–1927	1924	1925	1926	1927	1928	1929
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Missouri	248	185	275	240	188	210	300	19. 6	23. 0	12. 0	10. 0	20. 5	18. 0	16. 7
Virginia	246	180	250	264	230	265	250	21. 1	23. 0	19. 0	11. 4	20. 0	18. 2	17. 0
North Carolina	260	196	261	292	238	215	197	20. 7	22. 6	19. 0	11. 5	19. 5	18. 5	16. 7
South Carolina	185	160	160	182	148	147	185	20. 8	22. 1	18. 8	11. 7	19. 6	18. 4	16. 4
Georgia	140	157	155	180	154	132	170	20. 8	22. 4	19. 0	11. 1	19. 4	18. 2	15. 8
Florida	105	130	180	145	126	97	145	19. 9	22. 5	18. 8	10. 2	19. 1	17. 9	16. 7
Tennessee	181	170	210	188	178	185	220	20. 1	23. 2	16. 2	10. 0	19. 0	18. 0	16. 5
Alabama	145	154	185	196	180	150	178	20. 6	22. 7	18. 9	10. 7	19. 0	18. 2	16. 1
Mississippi	177	176	275	241	194	175	225	21. 6	23. 7	19. 5	11. 6	20. 5	18. 5	17. 2
Arkansas	166	169	205	195	157	162	186	20. 4	22. 8	16. 1	11. 0	20. 2	18. 2	16. 7
Louisiana	152	145	232	200	170	166	189	20. 2	22. 4	18. 1	11. 0	19. 2	17. 9	16. 6
Oklahoma	148	187	155	181	138	136	128	19. 7	22. 2	17. 0	9. 7	19. 8	17. 2	15. 7
Texas	133	138	113	147	129	138	106	20. 3	22. 4	18. 5	10. 8	19. 3	17. 5	16. 0
New Mexico	[1] 276	266	298	299	352	360	309	21. 6	25. 0	20. 0	12. 3	19. 8	19. 5	17. 7
Arizona	283	285	350	349	315	357	330	24. 2	26. 4	21. 5	13. 3	25. 6	23. 5	22. 5
California	282	284	340	387	340	378	375	22. 6	24. 0	22. 0	14. 0	21. 0	19. 5	18. 0
United States	155. 8	157. 4	167. 2	182. 6	154. 5	152. 9	155. 3	20. 5	22. 6	18. 2	10. 9	19. 6	18. 0	16. 4

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 6-year average.

Table 128.—*Cotton: Production of lint in 500-pound gross-weight bales, by States, and linters, United States, 1917–1929*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [1]
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
Missouri	61	62	64	79	70	[2] 149	[2] 127	[2] 193	[2] 299	218	115	147	215
Virginia	19	25	23	21	16	27	51	39	53	51	31	44	46
North Carolina	618	898	830	925	776	852	1,020	825	1,102	1,213	861	836	735
South Carolina	1,237	1,570	1,426	1,623	755	493	770	807	889	1,008	730	726	845
Georgia	1,884	2,122	1,660	1,415	787	715	588	[2] 1,002	1,164	1,496	1,100	1,030	1,345
Florida	38	29	16	18	11	25	12	[2] 22	38	32	[2] 17	19	29
Tennessee	241	330	310	325	302	391	[2] 226	[2] 354	[2] 515	[2] 451	[2] 359	[2] 428	515
Alabama	518	801	713	663	580	824	587	[2] 985	1,357	1,498	[2] 1,191	1,109	1,335
Mississippi	906	1,226	961	895	813	989	604	1,099	1,991	1,888	1,355	1,475	1,915
Arkansas	974	987	884	1,214	797	[2] 1,011	[2] 622	[2] 1,094	[2] 1,600	1,548	1,000	1,246	1,490
Louisiana	639	588	298	388	279	343	368	493	910	829	548	691	810
Oklahoma	959	577	1,016	1,336	481	627	656	1,511	1,691	1,773	1,037	1,205	1,200
Texas	3,125	2,697	3,099	4,345	2,198	3,222	[2] 4,340	[2] 4,949	[2] 4,163	[2] 5,628	[2] 4,352	[2] 5,106	3,950
New Mexico	------	------	------	10	6	12	[2] 30	[2] 57	[2] 66	[2] 75	[2] 70	[2] 88	84
Arizona	22	56	60	103	45	47	78	108	119	[2] 122	[2] 91	[2] 149	156
California	58	67	56	75	34	21	54	77	122	131	91	172	242
All other	6	6	5	3	3	7	[2] 8	[2] 14	[2] 26	[2] 17	[2] 7	[2] 7	7
United States	11,302	12,041	11,421	13,440	7,954	9,755	10,140	13,628	16,104	17,977	12,955	14,478	14,919
Linters, total U. S.[3]	1,126	930	608	440	398	608	669	897	1,115	1,158	1,016	------	------

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census.

[1] Preliminary estimate of the Department of Agriculture.
[2] Slight differences from census figures on ginnings are due to ginnings in one State of cotton grown in another.
[3] Year beginning Aug. 1.

Table 129.—*Cotton: Acreage and yield of lint per acre in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1926–27 to 1929–30*

Country	Acreage						Yield of lint per acre					
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1926–27	1927–28	1928–29	1929–30 preliminary	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1926–27	1927–28	1928–29	1929–30, preliminary
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*
United States	34,152	37,616	47,087	40,138	45,341	45,981	182	146	183	155	153	155
India	22,503	23,818	24,822	24,761	26,484	23,536	76	91	81	96	85	90
Egypt	1,743	1,768	1,854	1,574	1,805	1,912	399	368	409	382	431	411
China	------	4,498	4,152	4,192	4,265	------	------	215	201	214	207	------
Brazil	[1] 887	1,475	986	1,297	1,284	------	209	184	235	186	189	------
Russia (Asiatic)	1,569	741	1,620	1,858	2,270	2,559	276	197	228	256	260	248
Mexico	253	330	613	326	523	475	353	267	281	263	245	237
Chosen (Korea)	146	405	529	503	503	459	67	128	129	126	142	151
Uganda	58	420	570	533	699	684	169	122	92	104	112	------
Peru	[2] 163	284	316	316	284	------	------	343	372	372	------	------
Anglo Egyptian Sudan	44	134	225	239	285	373	158	163	279	221	238	207
Argentina	5	156	177	210	------	------	221	188	163	231	------	------
Total above countries excluding China, reporting 1926–27 to 1928–29	------	------	78,306	71,229	79,194	------	------	------	------	------	------	------
Estimated world total, excluding China	62,500	69,000	80,900	73,800	81,800	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Data for crop year as given at the head of the table are for crops harvested between Aug. 1 and July 31 of the following year. This applies to both Northern and Southern Hemispheres. For the United States prior to 1914 the figures apply to the harvest year beginning Sept. 1.

[1] Average for 3 years. [2] Average 1914–15 to 1918–19.

TABLE 130.—*Cotton: Production of lint in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1925–26 to 1929–30*

Country	Year beginning Aug. 1						
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1925–26	1926–27	1927–28	1928–29	1929–30, preliminary
NORTH AMERICA	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]
United States [2]	13,033,000	11,516,000	16,104,000	17,977,000	12,955,000	14,478,000	[1] 4,919,000
Mexico	187,000	184,152	200,476	359,820	179,000	268,637	[3] 235,442
Total North American countries reporting 1925–26 to 1928–29			16,304,476	18,336,820	13,134,000	14,746,637	
SOUTH AND CENTRAL AMERICA AND WEST INDIES							
Venezuela		[4] 37,093	32,000	32,000	32,000	32,285	
Colombia		[5] 14,184	15,912	24,906	11,207		
Peru	110,000	202,591	204,308	246,168	245,615	[3] 200,000	[3] 210,000
Ecuador	[6] 297	7,320	[3] 6,100	[3] 6,340	[3] 5,800	[3] 5,097	
Brazil	387,000	567,931	601,520	484,237	505,049	[3] 506,618	
Paraguay	[7] 92	9,686	11,481	10,625		[3] 40,000	
Argentina	2,314	61,105	133,844	60,419	101,467	[3] 180,000	
Guatemala	[8] 75	847	1,650	260			
Haiti [6]	9,300	18,445	23,035	22,604	20,419	21,929	
Dominican Republic [6]	[7] 992	515	640	414	273	76	
Porto Rico	[8] 1,319	1,356	1,891	1,373	960	1,335	
Salvador [6]		[9] 6,529	2,461	229			
British West Indies	6,058	4,451	3,876	4,281	4,245	2,500	
Total South and Central American countries and West Indies reporting 1925–26 to 1928–29			1,007,214	857,836	915,828	949,840	
EUROPE							
Italy	5,212	[4] 4,707					
Yugoslavia	922	333	580	385	189	218	345
Greece	16,770	10,746	14,609	17,759	12,571	14,875	
Bulgaria	842	1,686	2,068	2,309	3,457	4,344	4,400
Malta	433	377	655	424	287	453	
Spain		[5] 698	1,108	3,599	2,553	3,078	
Total European countries reporting 1925–26 to 1928–29			19,020	24,476	19,057	22,968	
AFRICA							
Algeria	[4] 1,370	1,917	5,583	7,642	4,086	6,164	8,000
Morocco (French)		[9] 275	415	738	369	323	
French West Africa:							
Dahomey	[6] 664	2,939	6,549	4,718	3,920		
Ivory Coast [6]	212	2,498	6,314	6,743	5,457		
French Guinea	[6] [8] 167	707	2,237	2,315	2,306	1,845	
Senegal		1,677	1,605	2,629	2,306	4,243	
French Sudan		[5] 4,843	6,065	1,753	3,920		
Upper Volta		[5] 7,124	12,683	3,044	4,059	4,704	
French Togo	[9] 2,312	5,254	5,677	7,661			
Nigeria	8,702	24,185	40,091	22,982	17,498	28,452	
French Equatorial Africa		[5] 1,170					
Egypt	1,453,000	1,360,600	1,650,000	1,586,000	1,257,000	1,628,000	1,642,000
Anglo-Egyptian Sudan	14,455	45,836	106,460	131,007	111,000	141,747	161,425
Italian Somaliland	[6] 510	1,576	2,537	2,767	3,828	7,034	8,000
Eritrea	948	[5] 1,373	1,845	2,767	1,384	1,845	
Gold Coast	104	690		84	84		
Belgian Congo		11,459	16,142	22,539	27,557		
Kenya	552	1,347	1,712	1,031	544		
Uganda	20,338	107,419	151,344	110,231	116,000	164,000	
Tanganyika	[6] [5] 7,971	11,122	18,179	20,318	18,467	22,931	

[1] Bales of 478 pounds net.
[2] Linters not included. Production of linters during this period has been: Average 1909–10 to 1913–14, 502,711 bales; 1925–26, 1,114,877 bales; 1926–27, 1,157,861 bales; 1927–28, 1,016,375 bales; 1928–29, 1,282,061 bales.
[3] From an unofficial source.
[4] Average for 3 years.
[5] Average for 4 years.
[6] Exports.
[7] For season 1915–16.
[8] For 1 year only.
[9] Average for 2 years.

TABLE 130.—*Cotton: Production of lint in specified countries, average 1909–10 to 1913–14, 1921–22 to 1925–26, annual 1925–26 to 1929–30*—Continued

Country	Year beginning Aug. 1						
	Average, 1909–10 to 1913–14	Average, 1921–22 to 1925–26	1925–26	1926–27	1927–28	1928–29	1929–30, preliminary
	Bales [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]	*Bales* [1]
Nyasaland	4,603	4,751	6,459	4,165	2,336	3,740	
Northern Rhodesia	[4] 307	274	414	80	44		
Southern Rhodesia		[5] 2,007	5,160	461	72	300	
Mozambique	[6] 388	2,645	2,230	11,952	14,732	5,650	
Union of South Africa	76	9,150	17,055	8,571	9,216	10,230	
Total African countries reporting 1925–26 to 1928–29			2,023,883	1,917,589	1,564,659	2,031,208	
ASIA							
Cyprus	1,938	1,994	2,556	3,598	1,766	1,796	
Turkey, Asiatic	[8] 102,116	64,280	105,172	97,000	179,412		
Syria and Lebanon		7,301	13,421	7,760	10,700	4,174	7,000
Russia, Asiatic	904,900	305,968	781,757	773,916	993,915	1,232,362	1,325,000
Iraq		1,071	2,125	2,929	1,500	4,300	6,695
Persia [6]	[3] 136,000	[9] 71,402	83,632	84,610	75,007	[3] 120,503	
India	3,585,000	4,522,600	5,201,000	4,205,000	4,990,000	4,718,000	4,452,000
China [10]	694,600	2,021,000	2,102,000	1,742,000	1,875,000	1,844,000	
Japanese Empire:							
Japan	4,704	2,459	1,561	1,123	1,100		
Chosen (Korea)	20,392	108,580	123,214	142,694	133,000	150,000	145,392
French Indo-China	[6] 13,800	[11] 9,279	[11] 5,667	[11] 3,285	[11] 4,536	2,988	
Dutch East Indies [6] [13]	[4] 18,242	6,649	[14] 5,469	4,388	5,500	4,262	
Siam	[6] 3,653	4,135	4,624	2,747	2,885		
Total Asiatic countries reporting 1925–26 to 1928–29			8,320,841	6,970,180	8,090,924	8,082,385	
OCEANIA							
Australia	75	7,920	5,692	4,431	8,591	8,240	5,050
New Hebrides	[4] 547	2,436	3,821	2,348	2,582		
Total Oceania reporting 1925–26 to 1928–29		7,920	5,692	4,431	8,591	8,240	
Total all countries reporting 1925–26 to 1928–29			27,681,126	28,111,332	23,733,059	25,841,278	
Estimated world total, including China	20,900,000	21,500,000	27,900,000	28,300,000	23,800,000	25,900,000	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Data for crop year as given at the head of the table are for crops harvested between Aug. 1 and July 31 of the following year. For the United States prior to 1914 the figures apply to the year beginning Sept. 1.

[1] Bales of 478 pounds net.
[3] From an unofficial source.
[4] Average for 3 years.
[5] Average for 4 years.
[6] Exports.
[8] For 1 year only.
[9] Average for 2 years.
[10] For 1921–22 to 1928–29, Chinese Economic Bulletin quoting the Chinese Mill Owners' Association. The figures represent the crop in the most important Provinces where the commercial crop is grown. The average 1909–10 to 1913–14 is the commercial crop of China as estimated by the United States Bureau of the Census.
[11] Annam, Cambodia, and Cochin-China only.
[12] Annam, Cambodia, Cochin-China, and Laos.
[13] Includes Java and Madura and the outer possessions.
[14] Java and Madura only.

TABLE 131.—*Cotton: World production of lint, 1909–10 to 1929–30*

Year	Estimated world total, excluding China	Estimated world total, including China	Principal producing countries: United States	India	Egypt	China[1]	Brazil	Russia (Asiatic)	Estimated world total commercial crop[2]
	1,000 bales[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[3]	*1,000 bales*[4]
1909–10	16,800		10,005	3,998	1,036			817	20,859
1910–11	18,460		11,609	3,254	1,555			1,006	18,856
1911–12	21,990		15,693	2,730	1,530		360	969	22,247
1912–13	21,190		13,703	3,702	1,554		418	946	21,550
1913–14	22,350		14,156	4,239	1,588		477	1,104	22,612
1914–15	24,270		16,135	4,359	1,337		465	1,270	24,964
1915–16	17,750		11,192	3,128	989		339	1,512	18,419
1916–17	18,370	19,910	11,450	3,759	1,048	1,534	337	1,199	18,924
1917–18	17,660	19,750	11,302	3,393	1,304	2,092	414	634	18,140
1918–19	17,790	20,850	12,041	3,328	999	3,059	406	161	18,755
1919–20	18,730	21,330	11,421	4,853	1,155	2,599	461	81	20,220
1920–21	19,110	20,990	13,440	3,013	1,251	1,883	476	58	19,665
1921–22	13,930	15,450	7,954	3,753	902	1,517	504	43	15,334
1922–23	16,980	19,300	9,755	4,247	1,391	2,318	553	55	17,959
1923–24	17,710	19,700	10,140	4,320	1,353	1,993	576	196	19,005
1924–25	22,620	24,800	13,628	5,095	1,507	2,179	605	453	23,825
1925–26	25,798	27,900	16,104	5,201	1,629	2,102	602	782	26,618
1926–27	26,558	28,300	17,977	4,205	1,586	1,742	484	774	27,813
1927–28	21,925	23,800	12,955	4,990	1,257	1,875	595	994	23,370
1928–29	24,056	25,900	14,478	4,718	1,628	1,844	[5] 507	1,232	25,751
1929–30[6]			14,919	4,452				1,325	

Bureau of Agricultural Economics. International Institute of Agriculture and official sources unless otherwise stated. Data for crop year as given are for crops harvested between Aug. 1 and July 31 of the following year. For the United States prior to 1914 the figures apply to the year beginning Sept. 1.

[1] Chinese Cotton Mill Owners' Association. Figures represent the crop in the most important cotton-producing Provinces where the commercial crop is grown. Most of the cotton produced in other Provinces is used for home hand-loom consumption.
[2] Figures as reported by the United States Bureau of the Census, including the cotton destined to enter commercial channels for factory purposes. Estimates of the commercial crop in China are included.
[3] Bales of 478 pounds net.
[4] American in running bales and foreign cotton in bales of 478 pounds net.
[5] Unofficial source.
[6] Preliminary.

TABLE 132.—*Cotton ginned to specified dates and total, by seasons, United States, 1909–1929*

Season beginning August	Cotton ginned to— Sept. 1	Sept. 25	Oct. 1	Oct. 18	Nov. 1	Nov. 14	Dec. 1	Dec. 13	Jan. 1	Jan. 16	Total ginned[1]
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1909	388	2,568		5,531	7,018	8,112	8,877	9,358	9,647	9,788	10,073
1910	353	2,312		5,424	7,346	8,780	10,140	10,695	11,085	11,253	11,568
1911	771	3,677		7,759	9,971	11,313	12,817	13,771	14,317	14,516	15,553
1912	731	3,007		6,874	8,869	10,300	11,855	12,439	12,907	13,089	13,489
1913	799	3,247		6,974	8,830	10,445	12,088	12,927	13,348	13,582	13,983
1914	480	3,394		7,620	9,827	11,668	13,073	13,972	14,443	14,916	15,906
1915	464	2,904		5,709	7,379	8,771	9,704	10,306	10,637	10,752	11,068
1916	851	4,082		7,303	8,624	9,615	10,352	10,839	11,039	11,138	11,364
1917	615	2,512		5,574	7,185	8,571	9,714	10,132	10,435	10,571	11,248
1918	1,038	3,771		6,811	7,777	8,706	9,571	10,281	10,774	11,049	11,906
1919	143	1,835		4,929	6,305	7,604	8,844	9,397	10,009	10,307	11,326
1920	352	2,250		5,755	7,509	8,915	10,141	10,876	11,555	12,015	13,271
1921	486	2,920		5,497	6,646	7,274	7,640	7,791	7,882	7,912	7,978
1922	806	3,866		6,978	8,139	8,870	9,320	9,489	9,597	9,648	9,729
1923	1,143	3,232		6,409	7,556	8,369	9,243	9,549	9,805	9,944	10,171
1924	947	[2] 2,666	4,528	7,616	9,716	11,162	12,238	12,792		13,307	13,639
1925	1,886	[2] 4,282	7,126	9,519	11,207	12,260	13,871	14,832		15,500	16,123
1926	697	[2] 2,509	5,643	8,728	11,254	12,956	14,644	15,541		16,616	17,755
1927	1,534	[2] 3,505	5,945	8,118	9,921	10,895	11,738	12,073		12,501	12,783
1928	957	[2] 2,501	4,961	8,151	10,162	11,321	12,560	13,144		13,889	14,297
1929[3]	1,570	[2] 3,353	5,906	9,099	10,889	11,898	12,858	13,462		14,188	

Bureau of Agricultural Economics. Compiled from reports of Bureau of the Census; quantities are given in running bales, except that round bales are counted as half bales. Linters not included.

[1] Includes cotton ginned after Jan. 16 and estimated quantities not ginned on Mar. 1.
[2] Sept. 16.
[3] Preliminary.

TABLE 133.—*Cotton: Estimated monthly marketings by farmers, 1916–1928*

Year beginning August	Percentage of year's sales [1]												
	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Season
1916	3.9	14.6	23.0	21.6	15.0	6.4	4.0	3.9	3.0	2.5	1.6	0.5	100.0
1917	2.5	11.3	23.0	22.7	16.2	8.2	5.8	4.5	2.6	1.3	1.0	0.9	100.0
1918	3.3	10.9	18.1	16.4	13.6	5.4	4.4	4.6	4.6	7.5	6.8	4.4	100.0
1919	1.4	9.5	21.0	22.2	17.4	8.8	5.6	4.9	3.2	2.7	1.7	1.6	100.0
1920	3.1	10.0	16.2	15.7	11.0	6.4	5.6	6.0	6.7	6.9	6.8	5.6	100.0
1921	3.6	14.0	22.3	17.1	12.1	5.9	4.3	4.6	4.6	5.9	3.0	2.6	100.0
1922	5.2	16.8	25.3	19.8	12.8	5.0	4.4	3.7	2.0	1.0	1.5	1.6	100.0
1923	4.1	16.3	24.6	24.9	13.3	5.8	3.1	2.4	1.7	1.3	0.9	1.6	100.0
1924	3.3	15.2	25.2	22.3	14.5	7.0	5.3	3.4	1.6	1.0	0.6	0.6	100.0
1925	6.5	19.3	23.1	17.6	12.0	6.5	4.2	3.1	2.3	1.7	2.1	1.6	100.0
1926	2.7	15.2	22.0	19.5	12.5	6.3	5.8	5.0	3.8	3.1	2.5	1.6	100.0
1927	6.6	20.0	23.8	17.3	9.7	4.2	4.0	4.2	3.1	2.7	2.3	2.1	100.0
1928	4.6	15.6	24.8	20.8	12.8	5.4	4.0	4.8	1.8	1.6	1.9	1.9	100.0

Bureau of Agricultural Economics.

[1] As reported by about 7,500 cotton growers, supplemented by records of State weighers, cooperative associations, and cotton dealers.

TABLE 134.—*Cotton: Consumption by domestic mills, 1919–20 to 1928–29, inclusive*

Month	1919–20	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
August	497	484	467	526	492	357	451	500	634	526
September	491	458	485	494	486	438	483	571	628	492
October	556	401	494	534	543	534	544	568	614	616
November	491	333	528	579	533	495	544	584	627	611
December	512	295	511	529	464	534	576	603	539	533
January	592	367	527	610	578	594	582	603	586	668
February	516	395	472	567	509	551	565	590	573	595
March	576	438	520	624	486	583	636	693	581	632
April	567	409	444	577	479	597	578	618	525	632
May	541	441	495	621	414	532	516	630	577	669
June	555	462	509	542	350	494	519	660	510	570
July	526	410	458	463	347	484	462	570	440	547
Total	6,420	4,893	5,910	6,666	5,681	6,193	6,456	7,190	6,834	7,091

Bureau of the Census. Quantities are in running bales, round bales counted as half bales and foreign in 500-pound bales. Linters not included.

TABLE 135.—*Cotton: Supply and distribution, United States, 1913 to 1928*

Year beginning Aug. 1	Supply					Distribution					
	Production	Carry-over from previous season		Imports	Total supply	Consumption		Exports	Stocks on hand at end of year		Total distribution [1]
		Foreign	Total			Foreign	Total		Foreign	Total	
	1,000 bales	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
1913	13,983	83	1,511	261	15,755	194	5,577	8,655	73	1,366	15,598
1914	15,906	73	1,366	382	17,654	222	5,597	8,323	145	3,936	17,856
1915	11,068	145	3,936	438	15,442	317	6,398	5,896	212	3,140	15,434
1916	11,364	212	3,140	292	14,796	318	6,789	5,303	143	2,720	14,812
1917	11,248	143	2,720	221	14,189	184	6,566	4,288	111	3,450	14,304
1918	11,906	111	3,450	202	15,558	176	5,766	5,592	83	4,287	15,645
1919	11,326	83	4,287	700	16,313	417	6,420	6,545	284	3,563	16,528
1920	13,271	284	3,563	226	17,060	216	4,893	5,745	174	6,534	17,172
1921	7,978	174	6,534	363	14,875	297	5,910	6,184	167	2,832	14,926
1922	9,729	167	2,832	470	13,031	344	6,666	4,823	196	2,325	13,814
1923	10,171	196	2,325	292	12,788	328	5,681	5,656	116	1,556	12,893
1924	13,639	116	1,556	313	15,508	276	6,193	8,005	106	1,610	15,808
1925	16,123	106	1,610	326	18,059	280	6,456	8,051	129	3,543	18,050
1926	17,755	129	3,543	401	21,699	309	7,190	10,927	99	3,762	21,879
1927	12,783	99	3,762	338	16,883	299	6,834	7,540	111	2,536	16,910
1928	14,297	111	2,536	458	17,291	311	7,091	8,044	182	2,312	17,447

Bureau of Agricultural Economics. Compiled from Bureau of Census Reports. Linters are excluded. Quantities are in running bales, round bales counted as half bales and foreign in 500-pound bales.

[1] Total distribution usually is greater than total supply due principally to the inclusion, in all distribution items, of the "city crop," which consists of rebaled samples and pickings from cotton damaged by fire and weather.

TABLE 136.—*Cotton: International trade, average 1910–1914, annual 1926–1929*

Country	Year ended June 30									
	Average, 1910–1914		1926		1927		1928		1929 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*	*1,000 bales*
United States	232	8,840	338	8,110	400	11,281	367	7,890	476	8,520
British India	57	2,154	96	3,218	413	2,422	167	2,528	88	3,250
Egypt	0	1,444	0	1,409	0	1,595	0	1,377	0	1,645
Argentina	0	[1] 1	0	71	0	88	0	41	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	4,143	0	3,345	0	3,728	0	2,460	0	3,164	0
Japan	[1] 1,405	0	3,233	0	3,485	0	2,617	0	3,112	0
France	1,440	337	1,565	88	1,692	133	1,623	122	1,668	108
Germany	2,142	221	1,587	205	1,812	280	2,563	392	1,757	353
Italy	902	0	1,023	2	1,037	1	982	1	1,121	0
Czechoslovakia	0	0	581	13	540	2	629	2	566	1
Spain	388	1	418	3	339	9	-------	-------	-------	-------
Belgium	[2] 663	[2] 278	407	2	362	6	376	18	404	21
Canada	155	0	274	0	296	0	261	0	306	0
Poland	-------	0	199	0	327	0	353	0	310	0
Austria	[1, 3] 906	[1, 3] 12	160	2	142	2	175	0	-------	-------
Switzerland	[1] 113	0	138	0	157	0	134	0	139	0
Netherlands	[1] 277	[1] 145	160	2	186	3	193	1	208	2
Sweden	[1] 93	[1] 1	97	0	114	0	111	0	101	0
Finland	[1] 37	0	40	0	41	0	46	0	38	0
Denmark	[1] 26	0	21	0	15	0	24	0	20	0
Norway	[1] 18	0	10	0	11	0	9	0	7	0
Estonia	0	0	[4] 21	0	24	0	26	0	24	0
Hungary	-------	-------	20	0	28	0	33	0	46	0
Total, 23 countries	12,997	13,434	13,733	13,125	15,149	15,822	13,149	12,372	12,434	13,900

Bureau of Agricultural Economics. Official sources except where otherwise noted. Bales of 500 pounds gross weight or 478 pounds net. The figures for cotton refer to ginned and unginned cotton and linters, but not mill waste, cotton batting, scarto (Egyptian and Sudan). Wherever unginned cotton has been separately stated in the original reports it has been reduced to ginned cotton in this statement at the ratio of 3 pounds unginned to 1 pound ginned. Wherever linters are stated separately, they have been excluded from these figures.

[1] Year ended Dec. 31.
[2] 3-year average.
[3] Average for Austria-Hungary.
[4] International Crop Report and Agricultural Statistics.

TABLE 137.—*Cotton: Estimated average price per pound, received by producers, United States, 1909–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	11.5	12.2	13.2	13.8	14.2	14.3	14.0	14.0	14.0	14.1	14.0	14.1	13.6
1910	14.4	13.8	13.6	14.0	14.2	14.4	14.1	13.9	14.0	14.4	14.5	13.8	14.0
1911	12.5	11.0	9.6	8.8	8.6	8.7	9.4	10.0	10.5	11.0	11.1	11.6	9.6
1912	11.6	11.2	11.0	11.4	12.0	12.0	11.8	11.8	11.7	11.6	11.6	11.6	11.5
1913	11.6	12.6	13.2	12.6	12.0	11.8	12.2	12.2	12.0	12.3	12.4	12.4	12.5
1914	10.6	8.2	7.0	6.6	6.7	7.0	7.4	7.8	8.6	8.8	8.6	8.4	7.4
1915	8.3	9.8	11.4	11.4	11.4	11.4	11.3	11.3	11.5	11.8	12.4	12.6	11.2
1916	13.6	15.0	16.8	18.8	18.4	17.0	16.4	17.0	18.4	19.6	22.4	24.5	17.3
1917	23.8	23.4	25.3	27.5	28.3	29.3	30.0	31.0	30.2	28.0	28.0	28.2	27.1
1918	30.0	32.0	30.6	28.4	28.2	26.8	24.4	24.2	25.2	27.8	30.3	31.8	28.8
1919	31.4	30.8	33.9	36.0	35.8	36.0	36.2	36.8	37.5	37.4	37.3	37.1	35.2
1920	34.0	28.3	22.4	16.6	12.7	11.6	11.0	9.8	9.4	9.6	9.7	9.7	15.8
1921	11.2	16.2	18.8	17.0	16.2	15.9	15.7	16.0	16.0	17.3	19.6	20.6	17.0
1922	20.9	20.6	21.2	23.1	24.2	25.2	26.8	28.0	27.6	26.2	25.9	24.8	22.8
1923	23.8	25.6	28.0	29.9	32.1	32.5	31.4	27.7	28.7	28.1	27.8	27.3	28.7
1924	27.8	22.2	23.1	22.5	22.2	22.7	23.0	24.5	23.7	23.0	23.0	23.4	22.9
1925	23.4	22.5	21.5	18.1	17.4	17.4	17.6	16.5	16.6	16.0	16.1	15.4	19.6
1926	16.1	16.8	11.7	11.0	10.0	10.6	11.5	12.5	12.3	13.9	14.8	15.5	12.5
1927	17.1	22.5	21.0	20.0	18.7	18.6	17.0	17.8	18.7	20.1	19.7	21.0	20.2
1928	18.8	17.6	18.1	17.8	18.0	17.9	18.0	18.8	18.5	18.0	17.9	17.8	18.0
1929	18.0	18.2	17.5	16.2	16.0	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of cotton for each State; yearly price obtained by weighting monthly prices by bales marketed monthly. Mean of prices reported on 1st of month and 1st of succeeding month, August, 1909–December, 1923.

TABLE 138.—*Cotton, middling: Average spot price per pound at 10 markets in stated years*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Norfolk:													
1928	19.03	18.17	18.80	19.11	19.46	19.26	19.23	20.11	19.37	18.73	18.67	18.86	19.07
1929	18.71	18.71	18.15	17.31	17.09								
Augusta:													
1928	19.11	18.00	18.70	18.94	19.22	19.11	19.19	19.92	19.03	18.60	18.94	18.67	18.95
1929	18.22	18.09	17.92	16.98	16.90								
Savannah:													
1928	18.88	17.89	18.65	19.00	19.45	19.25	19.14	20.09	19.27	18.43	18.49	18.51	18.92
1929	18.10	18.24	17.92	16.98	17.08								
Montgomery:													
1928	18.97	17.39	18.14	18.33	18.62	18.49	18.54	19.45	18.59	17.88	18.39	18.24	18.42
1929	17.65	17.61	17.24	16.34	16.26								
Memphis:													
1928	18.62	17.57	18.10	18.24	18.70	18.51	18.49	19.37	18.52	17.87	17.90	17.87	18.31
1929	17.77	17.51	17.05	16.29	16.31								
Little Rock:													
1928	18.45	17.60	18.18	18.25	18.71	18.50	18.41	19.43	18.65	17.61	17.85	17.88	18.29
1929	17.68	17.50	17.00	16.22	16.17								
Dallas:													
1928	18.02	17.13	17.99	18.32	18.67	18.42	18.41	19.40	18.55	17.67	17.89	17.77	18.19
1929	17.50	17.46	16.99	16.08	15.88								
Houston:													
1928	18.54	17.69	18.50	18.90	19.24	19.00	18.99	19.95	19.11	18.40	18.33	18.20	18.74
1929	18.04	18.30	17.86	17.00	16.77								
Galveston:													
1928	18.60	17.85	18.71	19.04	19.31	19.09	19.15	20.07	19.15	18.41	18.37	18.15	18.82
1929	18.08	18.27	17.98	17.09	16.88								
New Orleans:													
1909	12.28	12.66	13.48	14.40	14.96	15.23	14.88	14.74	14.64	14.89	14.85	14.93	14.33
1910	14.92	13.49	14.21	14.50	14.85	14.95	14.62	14.54	14.70	15.48	15.26	14.30	14.65
1911	11.96	11.29	9.61	9.35	9.17	9.53	10.31	10.65	11.61	11.72	12.07	12.93	10.85
1912	12.07	11.37	10.95	12.15	12.81	12.58	12.61	12.45	12.44	12.29	12.44	12.34	12.20
1913	12.02	13.11	13.73	13.26	12.98	12.93	12.90	12.95	13.11	13.36	13.79	13.34	13.12
1914	(1)	[2] 8.42	7.02	7.43	7.18	7.87	8.01	8.34	9.43	9.04	9.12	8.71	
1915	8.94	10.40	11.95	11.50	11.89	12.04	11.45	11.73	11.88	12.61	12.80	13.03	11.68
1916	14.26	15.27	17.24	19.45	18.34	17.33	17.14	17.94	19.51	20.06	24.18	25.41	18.84
1917	25.07	21.68	26.76	28.07	29.07	31.07	30.91	32.76	33.05	28.90	30.71	29.50	28.96
1918	30.23	33.22	31.18	29.75	29.44	28.84	26.97	26.84	26.70	29.22	32.09	33.93	29.87
1919	31.38	30.38	35.28	39.58	39.89	40.28	39.39	40.69	41.41	40.31	40.49	39.41	38.21
1920	34.03	27.48	20.95	17.65	14.59	14.53	12.85	11.08	11.17	11.80	11.03	11.49	16.55
1921	12.78	19.35	18.99	17.27	17.16	16.53	16.36	16.74	16.80	19.31	21.68	22.01	17.92
1922	21.55	20.74	22.05	25.34	25.48	27.51	28.78	30.43	28.42	26.63	28.61	25.73	25.94
1923	24.22	27.71	29.18	33.68	34.88	33.93	31.90	28.74	30.41	30.70	29.43	29.23	30.33
1924	26.65	22.79	23.48	23.95	23.66	23.66	24.61	25.52	24.52	23.54	24.07	24.05	24.21
1925	23.07	23.09	20.86	19.82	19.27	20.26	19.83	18.35	18.11	18.06	17.54	18.24	19.71
1926	18.01	16.14	12.68	12.52	12.22	13.17	13.82	14.10	14.42	15.68	16.47	17.63	14.74
1927	19.36	21.53	20.73	19.99	19.26	18.72	17.90	18.94	20.07	20.77	21.10	21.45	19.98
1928	19.00	17.94	18.79	19.00	19.36	19.14	19.07	19.97	19.23	18.74	18.81	18.73	18.98
1929	18.57	18.45	18.08	17.19	17.04								
10 markets combined:													
1915	[3] 8.80	10.29	11.99	11.49	11.97	12.10	11.64	11.78	11.94	12.67	12.89	13.11	11.72
1916	14.32	15.31	17.38	19.54	18.44	17.70	[4] 16.54	18.29	19.72	20.15	24.33	25.45	18.96
1917	25.26	22.08	26.86	28.21	29.19	31.05	30.97	32.84	32.87	29.32	30.10	29.44	29.02
1918	31.05	33.38	31.11	29.27	29.22	28.51	26.55	26.40	26.84	29.21	31.84	33.80	29.76
1919	31.50	30.30	35.44	39.59	39.70	40.46	39.49	40.68	41.74	41.01	40.58	39.58	38.34
1920	34.78	28.24	21.38	17.83	14.63	14.42	12.93	11.19	11.01	11.55	10.77	11.13	16.66
1921	12.53	19.50	19.25	17.43	17.47	17.04	16.73	17.12	16.92	19.22	21.58	22.27	18.09
1922	21.53	20.72	22.11	25.20	25.40	27.39	28.62	30.21	28.28	26.47	28.20	25.87	25.83
1923	24.22	27.67	28.90	33.30	34.39	33.69	31.73	28.54	30.25	30.32	29.37	29.32	30.14
1924	27.16	22.74	23.29	23.63	23.40	23.53	24.51	25.51	24.56	23.61	24.19	24.55	24.22
1925	23.35	23.23	20.95	19.92	19.31	20.04	19.63	18.33	18.05	17.95	17.52	17.92	19.68
1926	17.65	15.96	12.40	12.17	11.81	12.72	13.45	13.74	14.08	15.38	16.10	17.34	14.40
1927	19.16	21.19	20.35	19.74	18.99	18.44	17.60	18.76	19.76	20.54	20.82	21.25	19.72
1928	18.72	17.72	18.46	18.70	19.07	18.88	18.86	19.78	18.95	18.23	18.36	18.29	18.67
1929	18.04	18.01	17.62	16.75	16.64								

Bureau of Agricultural Economics. Prior to Aug. 16, 1915, compiled from quotations in Market Reports of the New York Cotton Exchange, except Sept. 23 to Nov. 16, 1914, when the exchange was closed, quotations for which time were taken from the New York Commercial and Financial Chronicle, from Aug. 16, 1915, compiled from daily reports to the bureau from the cotton exchanges of the various markets. Prices 1900–1908 for New Orleans and 1914–1926 for other markets are available in 1924 Yearbook, p. 756, Table 313, p. 757, Table 314, and 1927 Yearbook, Table 254, p. 920.

[1] Market closed.
[2] No quotations prior to Sept. 23. Average for 7 days' business.
[3] Does not include New Orleans.
[4] Does not include Savannah.

TABLE 139.—*Cotton: Average monthly premiums*[1] *for staple lengths for middling spot cotton at New Orleans, 1923–24 to 1928–29*

[Points]

Year and staple length	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Av.
1923–24													
15/16 inch	40	40	40	45	60	60	60	60	60	60	65	65	55
1 inch	60	60	60	60	60	75	80	80	80	85	90	95	74
1 1/16 inches	50	50	100	100	100	100	100	100	100	100	100	100	92
1 1/8 inches	100	100	175	175	175	205	175	175	175	175	175	175	163
1 3/16 inches	150	150	275	275	275	325	275	275	275	275	275	275	258
1 1/4 inches	225	225	500	420	400	420	400	400	400	400	400	400	380
1924–25													
15/16 inch	60	60	65	65	65	65	65	65	65	70	75	75	66
1 inch	112	112	112	125	125	110	120	100	90	110	120	110	112
1 1/16 inches	100	106	125	125	125	160	175	175	250	250	250	250	174
1 1/8 inches	175	175	175	225	250	360	400	400	550	530	550	550	362
1 3/16 inches	275	281	300	375	400	530	650	650	800	800	800	800	555
1 1/4 inches	400	412	450	525	550	820	1,000	1,000	1,150	1,150	1,150	1,150	813
1925–26													
15/16 inch	75	75	75	75	85	100	90	80	80	75	75	75	80
1 inch	100	100	100	105	115	125	120	110	100	100	100	100	106
1 1/16 inches	250	194	175	231	250	250	250	200	200	200	200	200	217
1 1/8 inches	550	287	300	375	400	400	400	350	350	350	350	350	372
1 3/16 inches	800	625	575	537	600	600	600	550	550	550	550	550	591
1 1/4 inches	1,150	887	800	850	900	900	900	900	900	900	900	900	907
1926–27													
15/16 inch	40	65	65	65	65	65	65	65	65	65	65	65	58
1 inch	75	110	110	100	100	100	100	100	100	100	100	100	100
1 1/16 inches	200	200	105	138	150	150	150	150	150	200	200	200	166
1 1/8 inches	350	350	235	238	250	250	250	250	250	300	300	300	277
1 3/16 inches	550	550	410	450	450	450	450	450	450	500	513	590	484
1 1/4 inches	900	900	670	800	840	875	900	900	900	900	900	900	730
1927–28													
15/16 inch	40	40	40	40	50	40	35	35	25	20	20	20	34
1 inch	75	75	75	75	100	100	100	100	75	60	60	60	80
1 1/16 inches	163	169	250	238	200	200	200	200	175	175	170	150	191
1 1/8 inches	244	263	350	338	300	300	300	300	250	250	245	225	280
1 3/16 inches	525	513	550	513	400	400	400	400	350	350	340	300	420
1 1/4 inches	788	788	850	800	650	650	650	650	550	550	535	475	661
1928–29													
15/16 inch	20	20	30	29	20	15	19	25	25	37	40	40	27
1 inch	60	60	84	95	85	75	75	75	92	104	118	125	87
1 1/16 inches	150	150	150	150	150	150	150	150	150	165	200	225	162
1 1/8 inches	225	206	200	200	200	200	200	200	200	230	275	300	220
1 3/16 inches	300	300	300	300	300	300	300	300	309	345	400	425	323
1 1/4 inches	475	494	488	450	450	450	450	450	450	540	675	750	510

Bureau of Agricultural Economics. Based on weekly quotations for middling 7/8-inch staple. See Table 268, p. 852, 1928 Yearbook for data for earlier years.

[1] Premiums are stated in points or hundredths of a cent per pound.

TABLE 140.—*Cotton: Average monthly premiums and discounts for grades above and below middling for the 10 designated spot markets, 1925–26 to 1928–29*

Year and month	Grade [1]								
	Middling fair	Strict good middling	Good middling	Strict middling	Middling (average price) [2]	Strict low middling	Low middling	Strict good ordinary [3]	Good ordinary
August:	*On* [4]	*On*	*On*	*On*		*Off* [4]	*Off*	*Off*	*Off*
1925–26	100	76	54	32	23.35	56	127	231	338
1926–27	104	84	62	44	17.65	128	335	546	691
1927–28	130	106	76	51	19.16	103	213	333	448
1928–29	84	60	39	26	18.72	44	98	164	234
September:									
1925–26	96	72	48	28	23.23	60	140	244	353
1926–27	109	87	64	45	15.96	121	317	517	658
1927–28	125	102	73	49	21.19	100	211	333	447
1928–29	83	59	39	25	17.72	67	138	209	285
October:									
1925–26	115	89	65	41	20.95	83	181	290	400
1926–27	111	88	65	43	12.40	102	260	419	546
1927–28	124	101	68	48	20.35	82	187	307	417
1928–29	83	62	41	26	18.46	79	159	237	321
November:									
1925–26	138	110	84	58	19.92	111	240	376	496
1926–27	125	102	78	53	12.17	99	232	344	483
1927–28	105	83	60	41	19.74	48	124	221	314
1928–29	81	61	41	26	18.70	81	161	242	327
December:									
1925–26	146	118	92	64	19.31	114	271	428	556
1926–27	134	110	86	61	11.81	99	228	358	472
1927–28	94	69	45	30	18.99	36	85	162	241
1928–29	78	58	39	25	19.07	79	157	238	322
January:									
1925–26	153	124	96	67	20.04	117	295	466	602
1926–27	136	112	88	62	12.72	101	230	360	475
1927–28	93	68	44	29	18.44	35	80	150	227
1928–29	77	57	39	25	18.87	78	162	247	336
February:									
1925–26	154	125	94	66	19.63	130	306	481	613
1926–27	139	115	91	65	13.45	102	225	350	464
1927–28	91	65	40	25	17.60	34	74	146	220
1928–29	78	58	39	26	18.86	78	162	250	340
March:									
1925–26	147	119	87	62	18.33	131	313	499	640
1926–27	139	115	91	65	13.74	96	204	330	444
1927–28	91	65	40	25	18.76	33	73	138	213
1928–29	79	59	41	28	19.77	77	161	250	340
April:									
1925–26	120	96	72	50	18.05	130	327	524	670
1926–27	139	115	91	65	14.08	99	204	329	442
1927–28	90	64	39	25	19.77	33	73	138	213
1928–29	80	60	42	29	18.94	76	161	250	340
May:									
1925–26	107	86	64	43	17.95	130	336	547	699
1926–27	139	115	91	65	15.38	98	206	331	444
1927–28	89	64	40	25	20.53	33	77	143	218
1928–29	80	61	43	30	18.24	75	160	250	340
June:									
1925–26	105	83	62	44	17.52	128	336	548	699
1926–27	139	115	89	63	16.10	98	208	333	445
1927–28	87	63	40	26	20.82	34	80	147	222
1928–29	83	64	49	35	18.36	74	160	250	340
July:									
1925–26	105	84	62	43	17.92	128	338	548	693
1926–27	139	115	86	60	17.34	100	210	333	446
1927–28	85	61	39	26	21.25	37	86	153	227
1928–29	84	65	51	38	18.29	73	160	250	340
Average:									
1925–26	124	98	73	50	19.68	110	268	432	563
1926–27	129	106	82	58	14.40	104	238	379	501
1927–28	100	76	50	33	19.72	51	114	198	284
1928–29	81	60	42	28	18.67	73	153	236	322

Bureau of Agricultural Economics.

[1] White Standards.
[2] Based on ⅞-inch staple.
[3] These grades are not deliverable on future contracts.
[4] The differences are stated in terms of points or hundredths of a cent per pound. By "On" is meant that the stated number of points is to be added to the price of middling and by "Off" is meant that the stated number of points is to be subtracted from the price of middling.

TABLE 141.—*Cotton: Average spot price per pound in specified foreign markets, 1912–1929*

LIVERPOOL, AMERICAN MIDDLING [1]

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1912	13.83	13.55	12.59	13.82	14.31	14.06	13.97	13.97	14.00	13.58	13.67	13.61	13.75
1913	13.38	15.10	15.55	14.94	14.54	14.34	14.25	14.28	15.02	15.20	15.71	14.74	14.75
1914	13.23	12.22	10.53	9.25	8.93	9.77	10.06	10.46	11.37	10.42	10.47	10.32	10.50
1915	10.79	12.24	13.90	13.74	15.03	15.99	15.61	15.48	15.47	16.77	16.47	15.94	14.79
1916	17.54	18.99	20.69	23.05	22.16	21.76	21.34	24.07	25.23	26.17	34.07	37.65	24.39
1917	38.21	35.96	34.85	43.38	44.25	46.16	45.88	47.19	46.52	42.28	43.89	43.09	42.64
1918	45.26	48.44	46.46	43.97	42.30	37.66	34.53	30.39	33.24	35.70	38.25	38.33	39.54
1919	34.06	32.20	38.06	41.90	40.92	43.61	41.61	45.16	44.17	42.51	44.48	41.83	40.88
1920	38.31	31.33	24.41	19.18	14.74	15.32	12.71	11.78	12.07	12.53	11.66	11.94	18.00
1921	13.34	20.70	20.85	18.46	18.84	18.12	17.75	19.21	18.89	21.42	23.46	24.98	19.67
1922	24.90	23.98	24.55	27.96	28.26	30.64	30.93	31.42	30.29	28.43	31.53	29.28	28.51
1923	28.18	31.99	31.96	35.74	36.00	34.33	32.53	29.77	33.15	32.00	30.74	30.38	31.90
1924	31.62	25.06	26.13	26.09	25.73	25.90	27.17	27.95	26.85	25.83	27.34	27.76	26.12
1925	26.28	26.25	23.17	21.51	20.51	21.68	21.40	20.32	20.31	20.73	19.98	19.76	21.82
1926	19.69	19.35	14.51	14.08	13.34	14.55	15.56	15.65	16.24	17.90	18.55	19.42	16.57
1927	21.10	24.17	23.36	22.73	21.98	21.68	20.53	21.80	22.75	23.52	23.82	24.44	22.66
1928	21.39	20.87	21.85	21.62	21.57	21.39	21.09	22.33	21.56	20.66	20.88	21.09	21.36
1929	21.01	21.0	20.5	19.6	19.2	------	------	------	------	------	------	------	------

LIVERPOOL, EGYPTIAN UPPERS, GOOD [2]

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1912	20.2	19.1	18.3	18.9	19.3	19.9	20.1	20.2	20.3	20.2	19.7	19.0	19.6
1913	18.8	20.0	20.2	20.0	19.5	18.9	17.9	17.3	17.9	18.1	18.2	17.6	18.7
1914	16.5	16.1	13.5	12.6	12.2	12.2	12.8	14.0	15.5	14.5	14.4	13.8	14.0
1915	14.1	15.4	18.1	17.9	18.6	21.9	22.5	22.4	21.6	22.4	23.5	23.7	20.2
1916	23.7	27.2	31.2	39.5	39.6	39.7	41.9	44.5	50.5	52.0	55.4	60.3	42.1
1917	60.9	52.0	46.7	51.6	54.4	53.8	51.5	54.9	56.3	54.0	52.6	54.4	53.6
1918	55.8	55.4	54.3	51.7	50.4	50.3	50.0	49.3	48.3	48.3	58.4	46.4	50.7
1919	48.8	48.8	53.4	67.0	76.3	94.0	105.0	108.7	107.6	97.1	81.3	71.6	80.0
1920	68.6	53.4	37.0	29.4	23.4	24.6	20.8	19.6	21.5	18.8	18.8	18.0	29.5
1921	18.6	29.3	33.3	28.3	29.4	28.8	27.4	28.4	26.8	28.1	29.7	29.4	28.1
1922	28.1	27.4	27.3	30.7	31.2	31.9	32.5	33.9	33.0	30.4	31.9	31.0	30.8
1923	31.5	33.4	33.5	39.6	41.5	39.7	39.0	37.5	41.2	43.9	43.3	43.6	39.0
1924	45.6	35.5	34.3	35.4	37.5	40.3	41.3	45.1	43.6	42.1	41.6	41.4	40.0
1925	39.5	37.1	35.0	32.6	30.8	29.9	28.5	26.2	25.9	27.3	26.2	25.2	30.3
1926	26.0	28.0	23.8	22.2	19.4	21.8	24.3	23.5	23.3	26.7	28.3	30.2	24.4
1927	32.0	33.2	31.8	31.3	29.9	28.3	27.6	30.0	32.7	33.3	31.3	30.4	31.8
1928	27.1	25.1	25.9	25.6	25.5	25.5	25.0	26.7	25.7	24.0	23.5	23.7	25.3
1929	23.6	24.2	23.0	22.3	22.0	-----	------	------	------	------	------	---	------

LIVERPOOL, NO. 1 OOMRAS, FULLY GOOD [2]

1912	12.2	11.9	11.6	12.1	12.5	12.7	12.8	12.7	12.5	12.2	11.9	11.8	12.2
1913	11.6	12.9	12.9	12.8	12.5	12.0	11.5	11.5	11.5	11.4	11.0	10.6	11.8
1914	9.7	9.1	8.8	7.9	7.7	8.5	8.4	8.5	9.2	8.9	9.1	8.9	8.7
1915	9.1	9.7	10.9	10.7	11.9	12.6	12.4	12.1	11.9	13.0	12.8	12.9	10.7
1916	14.2	15.0	15.8	17.6	16.6	16.9	17.3	20.2	21.0	22.1	31.2	33.4	20.1
1917	34.2	31.9	36.9	37.6	37.2	38.2	37.6	38.2	38.2	35.2	36.8	36.8	36.6
1918	37.8	44.1	42.4	37.5	34.3	35.3	32.6	27.7	28.9	30.1	32.4	32.2	34.6
1919	30.7	29.0	30.5	32.1	32.0	32.6	30.0	32.3	31.8	30.2	29.1	26.1	30.5
1920	23.8	21.6	18.5	15.7	12.0	11.9	10.6	9.2	9.4	9.8	9.2	9.3	13.4
1921	10.5	16.0	16.9	15.3	15.4	15.3	14.9	15.4	16.0	15.7	18.9	19.7	15.8
1922	19.8	18.9	18.8	20.6	20.5	21.9	22.2	21.7	20.7	19.4	20.8	20.2	20.5
1923	19.6	21.8	22.0	25.9	27.7	26.1	25.2	22.4	24.0	22.9	22.6	22.0	23.5
1924	23.4	19.7	22.3	23.3	23.5	22.6	23.5	23.2	22.2	21.2	21.6	22.0	22.4
1925	21.5	22.0	19.9	18.1	16.8	17.4	16.8	15.4	15.1	15.6	15.0	15.2	17.4
1926	15.5	15.4	12.5	12.1	11.5	12.5	13.3	13.4	13.9	15.4	16.2	17.0	14.1
1927	17.8	20.1	19.3	17.7	17.6	17.4	16.5	17.5	17.9	18.3	18.6	18.5	18.1
1928	16.0	14.7	15.7	15.9	16.4	17.1	15.8	16.9	15.5	14.8	15.1	15.3	15.8
1929	15.1	15.0	14.7	13.9	13.7	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par.

[1] International Yearbook of Agricultural Statistics, 1921, p. 443. London Economist, 1922 to date, Average of weekly quotations.

[2] London Economist, average of weekly quotations to August, 1925, inclusive. Subsequently from Liverpool Cotton Association Daily Report.

TABLE 142.—*Cottonseed: Estimated production and estimated price per ton, December 1, by States, 1922–1929*

State	Production, year beginning August[1]—								Estimated price per ton							
	1922	1923	1924	1925	1926	1927	1928	1929	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 short tons	*1,000 short tons*	*1000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Missouri	66	57	86	133	97	51	65	95	36.30	38.60	32.40	36.00	16.80	36.90	35.00	31.00
Virginia	12	22	17	23	23	14	19	20	34.50	43.30	36.30	35.00	26.00	42.00	41.00	30.00
North Carolina	378	452	366	488	539	382	371	326	39.30	44.60	35.00	33.00	22.00	37.00	40.00	29.00
South Carolina	218	341	357	394	448	324	322	375	41.30	48.00	36.10	32.00	21.00	39.50	39.00	28.00
Georgia	317	261	445	516	664	488	457	597	39.70	47.90	34.10	33.00	21.00	38.50	37.00	28.00
Florida	12	6	10	17	14	8	9	13	35.30	43.20	32.10	34.00	19.00	30.50	36.00	30.00
Tennessee	174	101	157	229	200	159	190	229	41.40	49.70	35.20	25.50	19.00	37.00	38.00	29.00
Alabama	366	260	438	602	665	529	492	593	36.60	47.60	34.30	29.00	19.00	37.00	38.00	29.00
Mississippi	439	268	487	884	838	602	655	851	36.60	49.30	35.70	22.00	21.00	38.50	39.00	32.50
Arkansas	449	276	486	711	687	444	554	662	35.30	44.40	33.20	18.30	17.50	36.50	37.50	29.00
Louisiana	152	163	219	404	368	243	307	360	32.30	40.70	29.20	24.50	18.00	33.00	32.50	31.00
Oklahoma	279	291	671	751	787	461	536	534	29.70	37.70	28.60	26.50	15.40	37.00	34.00	31.00
Texas	1,433	1,927	2,197	1,849	2,499	1,938	2,274	1,759	33.50	40.10	31.10	28.50	17.50	36.00	35.00	32.00
New Mexico	5	14	25	30	33	31	39	37	30.00	40.50	30.00	28.00	18.00	30.00	32.00	28.00
Arizona	21	34	48	53	54	41	66	69	25.30	40.70	21.20	26.60	18.00	30.00	30.00	26.00
California	12	24	35	54	58	40	76	107	40.00	50.00	40.00	40.00	20.00	37.50	31.50	27.00
All other	3	4	6	11	8	4	3	3	35.67	48.00	34.00	36.00	20.00	37.25	37.33	29.23
United States	4,336	4,502	6,051	7,150	7,982	5,759	6,435	6,630	35.67	43.00	32.39	27.27	18.68	36.80	36.28	30.33

Bureau of Agricultural Economics.

[1] Compiled from reports of Bureau of the Census. Estimated production of lint, by States (December preliminary estimate for 1929), in rounded thousands of 500 pounds gross weight bales, adjusting for net weight and assuming 65 pounds of cottonseed for each 35 net pounds of lint.

TABLE 143.—*Cottonseed and cottonseed products: Production in the United States, 1909–1929*

Year beginning August	Cottonseed		Cottonseed products		
	Produced[1]	Crushed	Crude oil	Cake and meal	Hulls
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
1909	4,462	3,269	491	1,326	1,289
1910	5,175	4,106	630	1,792	1,375
1911	6,997	4,921	756	2,151	1,642
1912	6,104	4,580	697	1,999	1,540
1913	6,305	4,848	725	2,220	1,400
1914	7,186	5,780	860	2,648	1,677
1915	4,992	4,202	627	1,923	1,220
1916	5,113	4,479	704	2,225	969
1917	5,040	4,252	656	2,068	996
1918	5,360	4,479	663	2,170	1,137
1919	5,074	4,013	606	1,817	1,143
1920	5,971	4,069	655	1,786	1,256
1921	3,531	3,008	465	1,355	937
1922	4,336	3,242	501	1,487	944
1923	4,502	3,308	490	1,518	941
1924	6,051	4,605	702	2,126	1,331
1925	7,150	5,558	809	2,597	1,547
1926	7,982	6,306	944	2,840	1,854
1927	5,759	4,654	738	2,093	1,320
1928	6,435	5,059	802	2,281	1,367

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census. Production for cottonseed, 1928 estimate of the Department of Agriculture.

[1] Production of cottonseed relates to the preceding crop year.

TABLE 144.—*Cottonseed: Estimated average price per ton, received by producers, United States, 1910–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	------	26.23	26.86	25.36	25.65	26.35	25.61	25.49	26.12	25.46	23.38	22.70	25.82
1911	20.45	18.09	16.73	16.69	16.70	16.57	16.81	18.21	18.62	19.21	19.24	19.04	17.08
1912	18.02	17.61	18.04	18.57	21.42	21.98	22.01	21.55	21.89	21.88	21.54	21.37	19.10
1913	20.24	21.07	22.01	22.46	23.48	22.70	23.37	23.60	24.17	23.56	23.62	22.78	22.39
1914	20.16	13.88	15.28	14.01	17.73	19.14	23.33	22.32	22.69	22.07	20.82	20.05	16.50
1915	20.14	20.98	33.73	34.01	35.54	36.85	36.75	36.56	38.13	37.91	35.79	36.06	32.65
1916	35.22	41.13	47.19	55.82	56.35	52.53	51.43	53.18	55.94	55.61	57.19	56.90	49.13
1917	56.61	57.58	65.02	69.38	68.29	67.51	66.95	68.27	68.08	68.16	66.03	64.11	66.15
1918	61.34	67.90	65.85	64.97	65.05	64.93	64.65	64.00	64.28	63.83	63.80	64.24	65.23
1919	66.23	62.13	66.95	72.65	69.07	69.88	69.34	67.18	68.71	69.88	66.16	61.64	67.27
1920	43.22	29.96	28.94	26.00	19.83	18.96	19.76	18.92	17.23	17.28	17.06	18.75	22.95
1921	22.06	27.19	31.05	29.15	28.78	29.24	30.17	32.72	40.79	40.21	37.71	36.92	29.72
1922	32.44	25.37	31.79	40.18	42.93	43.35	45.16	46.32	47.60	46.58	43.14	41.42	34.70
1923	37.47	40.88	40.90	45.92	45.54	44.37	43.27	41.34	40.42	40.53	39.96	39.07	42.23
1924	38.44	31.74	31.95	33.57	35.48	37.50	37.14	38.21	37.94	38.61	36.66	36.41	34.08
1925	36.52	33.48	32.82	27.64	27.87	28.40	29.06	29.47	31.51	30.84	31.89	31.31	30.82
1926	29.73	27.38	20.06	18.66	18.05	18.55	22.39	25.43	25.80	26.05	26.27	26.59	21.55
1927	25.95	34.41	36.60	37.51	37.14	37.40	37.44	37.77	39.40	43.00	41.25	39.27	35.94
1928	36.87	30.98	34.08	37.17	37.74	38.05	38.73	39.36	38.94	37.78	35.83	34.84	35.39
1929	32.69	31.03	31.40	30.75	30.31	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Based upon returns from special-price reporters. Monthly prices weighted by production of cotton for each State; yearly price obtained by weighting monthly prices by monthly receipts at oil mills.

TABLE 145.—*Cottonseed oil, prime summer yellow: Average spot price per pound, in barrels, New York, 1920–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	12.32	13.48	11.43	10.14	8.91	8.59	7.34	6.26	6.24	7.22	7.46	8.57	9.00
1921	8.69	9.88	8.69	8.30	8.28	8.62	9.96	11.48	11.57	11.71	11.33	10.97	9.96
1922	9.96	8.54	8.88	9.51	9.81	10.77	10.90	11.78	11.76	11.60	11.48	10.35	10.44
1923	10.34	11.62	12.01	11.67	11.00	11.00	10.03	9.77	10.09	9.82	10.42	11.98	10.81
1924	12.83	10.54	11.00	10.86	11.41	11.10	10.69	11.10	11.08	10.51	10.75	11.38	11.19
1925	11.09	10.81	9.86	10.32	10.47	11.33	11.28	12.24	12.38	14.48	15.38	14.99	12.05
1926	12.99	11.42	8.82	8.20	8.22	8.50	9.31	9.39	8.78	9.09	9.19	9.57	9.46
1927	9.89	10.74	10.83	10.55	10.06	10.02	9.27	9.64	10.04	10.52	10.22	10.03	10.15
1928	9.44	10.03	9.84	9.69	10.21	10.33	10.88	10.74	10.11	9.75	9.64	9.62	10.02
1929	9.27	9.19	9.23	9.01	8.77	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. 1920–21, from annual reports of the New York Produce Exchange, subsequently compiled from Oil, Paint, and Drug Reporter average of daily ranges. Data for 1890–1919 are available in 1924 Yearbook, p. 766, Table 323.

TABLE 146.—*Cottonseed meal, 41 per cent protein: Price per ton, Memphis, 1920–1929*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	------	------	------	36.30	30.80	30.20	29.20	27.00	------	29.00	32.80	35.00	------
1921	------	38.20	35.70	35.00	36.30	37.10	39.30	45.10	47.60	49.25	47.50	44.75	------
1922	35.30	34.30	40.25	46.00	45.40	45.75	45.00	43.60	43.10	42.40	40.80	41.40	41.90
1923	43.20	42.50	44.90	47.40	45.00	43.60	41.00	39.60	39.50	39.50	40.25	43.60	42.50
1924	43.60	41.40	40.75	38.75	39.25	37.70	35.75	35.90	36.80	38.40	38.80	41.50	39.00
1925	44.10	36.90	34.40	34.10	34.00	32.60	31.10	31.00	31.90	30.70	31.00	31.10	33.60
1926	32.10	28.90	23.90	23.70	24.50	30.10	33.50	32.40	32.50	34.00	37.40	36.00	30.75
1927	([1])	37.40	37.70	39.60	41.40	40.40	45.10	49.30	55.50	61.50	([1])	41.50	---
1928	([1])	38.40	43.90	41.20	45.60	44.90	44.40	42.70	38.75	35.50	34.25	38.75	---
1929	([1])	41.00	39.30	37.80	37.00	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

[1] Not reported.

TABLE 147.—*Cottonseed meal, 41 per cent protein, bagged: Average price per ton at 10 markets, 1929*

Market	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Boston	54.00	53.60	51.75	48.00	45.20	43.70	46.25	47.40	48.80	47.50	46.40	45.25
Philadelphia	52.60	52.40	50.70	46.60	43.80	42.60	46.40	46.40	48.60	47.10	45.75	44.75
Buffalo	51.20	50.50	49.00	45.00	42.10	40.70	44.40	45.50	47.00	45.40	43.90	43.40
Pittsburgh	50.25	50.00	48.70	45.20	42.40	40.40	43.40	44.30	47.00	45.60	43.90	43.75
Cincinnati	49.60	49.00	47.50	43.60	40.90	39.40	43.00	43.75	46.00	44.80	43.20	42.00
Chicago	49.40	48.90	47.50	44.00	41.10	39.20	42.60	43.60	46.00	43.70	42.50	41.40
Milwaukee	47.20	47.90	47.40	44.10	42.90	40.60	43.60	43.70	46.25	44.75	43.50	43.50
Minneapolis	50.30	49.75	48.50	45.75	43.00	------	------	44.80	47.10	46.10	44.60	44.00
Los Angeles	44.00	44.00	43.75	43.70	43.00	42.00	41.75	44.00	[1] 42.25	43.00	42.25	------
St. Louis	------	------	46.00	43.00	39.60	37.90	41.30	43.20	45.10	42.40	41.30	40.50

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

[1] 40% protein.

TABLE 148.—*Cottonseed oil: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	[1] 4,715	292,257	0	62,415	0	40,901	0	67,982	0	51,702
United Kingdom	44,246	53,920	11,198	44,092	24,940	50,082	17,315	47,044	16,735	35,797
Egypt	1,927	3,568	391	8,101	1	30,532	0	31,229	0	17,579
Peru	0	[2 3] 158	0	7,309	0	10,601	0	15,596	0	11,077
China	0	2,110	0	4,903	0	0	0	0	------	------
Brazil	4,680	[4] 12	69	1,639	25	97	------	------	------	------
PRINCIPAL IMPORTING COUNTRIES										
Canada	21,131	0	30,136	0	29,939	0	54,118	0	44,254	0
Netherlands	40,141	392	22,643	5,016	20,985	6,472	24,370	9,838	8,685	7,264
Germany	51,884	0	30,652	38	13,298	164	25,897	34	12,984	20
France	24,666	2,509	7,910	35	8,189	28	7,597	55	7,767	3
Norway	11,284	0	5,102	0	6,239	0	5,582	0	2,798	0
Denmark	[3] 7,081	0	4,721	287	8,398	558	6,131	609	6,530	0
Belgium	16,884	8,143	2,689	0	1,984	7	3,918	4	2,026	51
Argentina	7,510	12	1,838	2	768	10	2,461	210	------	------
Sweden	5,220	[1] 20	1,545	184	3,490	432	3,295	1,097	2,721	49
Greece	0	0	[2] 1,300	0	1,078	0	3,315	0	1,201	0
Australia	1,062	0	[2] 800	[2] 0	[2] 1,489	[2] 0	[2] 1,709	[2] 3	------	------
Czechoslovakia	0	0	281	0	312	0	130	0	282	0
Uruguay	[2] 3,938	0	146	0	382	0	[2] 565	0	------	------
Italy	34,498	6	105	2	233	1	59	1	327	0
Algeria	2,728	1,177	3	46	53	68	[2] 85	[2] 26	------	------
Total 21 countries	283,595	364,284	121,529	134,069	121,803	139,953	156,547	173,728	106,310	123,542

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] 3-year average.
[2] International Yearbook of Agricultural Statistics.
[3] 4-year average.
[4] 1 year only.

TABLE 149.—*Cottonseed oil, crude: Average price per pound, f. o. b. mills, 1909–1929* [1]

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	5.01	4.82	5.63	5.97	6.32	6.18	6.12	6.46	7.03	7.12	7.27	7.27	6.27
1910	------	7.00	6.44	6.17	6.20	6.14	5.80	5.55	5.20	5.43	5.47	4.88	------
1911	4.27	4.80	4.38	4.40	4.15	4.36	4.52	4.60	5.48	6.22	5.80	5.30	4.86
1912	5.24	4.95	4.84	5.02	5.27	5.22	5.36	5.44	6.03	5.87	6.23	6.20	5.47
1913	6.10	6.18	5.94	6.06	5.83	6.10	6.16	6.30	6.60	6.53	6.26	6.40	6.20
1914	5.26	5.36	4.71	4.54	4.44	5.15	5.81	6.00	5.60	5.16	5.09	4.83	5.16
1915	4.40	5.41	6.67	6.64	7.31	7.71	7.67	8.72	9.18	9.61	9.54	9.20	7.67
1916	8.85	8.82	10.10	11.35	11.35	11.10	11.20	11.64	13.20	14.10	14.67	14.00	11.70
1917	13.92	13.86	15.93	17.40	17.33	17.50	17.50	17.50	17.50	17.50	17.50	17.50	16.74
1918	17.50	17.50	17.50	17.50	17.50	17.60	17.50	17.50	17.50	17.50	21.56	21.75	18.19
1919	21.75	17.38	16.25	18.95	18.46	19.74	18.25	17.69	16.19	15.62	15.50	11.50	17.27
1920	10.00	10.25	10.35	7.08	6.19	6.10	5.80	4.70	4.43	5.34	5.74	6.76	6.90
1921	6.75	7.81	7.26	7.00	7.02	7.16	8.28	10.15	9.80	10.00	9.75	8.88	8.32
1922	8.50	6.46	7.34	8.30	8.52	9.84	9.92	10.45	10.25	9.88	9.75	9.00	9.02
1923	------	9.94	9.44	9.88	9.45	9.46	8.84	8.46	8.74	8.20	8.78	10.06	------
1924	11.30	8.34	9.03	8.85	9.69	9.48	9.20	9.95	10.00	9.34	9.75	------	------
1925	------	9.14	8.55	8.90	8.98	9.75	10.71	11.00	11.22	12.17	------	------	------
1926	10.88	8.19	7.44	6.64	6.36	6.94	8.20	7.73	7.33	7.74	8.04	------	------
1927	8.70	9.25	9.45	9.05	8.72	8.48	7.75	8.44	8.75	8.88	------	------	------
1928	------	8.16	8.14	8.24	8.38	8.63	9.12	9.00	8.37	7.94	------	------	------
1929	------	7.66	7.33	7.38	7.26	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Prices 1909–1912 and 1919–1928 are averages of weekly quotations in the Oil, Paint, and Drug Reporter; 1913-1918 from War Industries Board Price Bulletin No. 15. Beginning August, 1928, prices are average of daily quotations.

[1] Quoted as follows: Prior to 1922 as f. o. b. mills; 1922, southeastern, pounds; 1923–1927, southeastern, tanks; beginning August, 1928, immediate southeastern.

TABLE 150.—*Sugar beets: Acreage, production, yield per acre, price per ton, and value by States, 1925–1929*

State	Acreage 1925	Acreage 1926	Acreage 1927	Acreage 1928	Acreage 1929	Production 1925	Production 1926	Production 1927	Production 1928	Production 1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Ohio	43	35	37	38	22	427	340	325	266	185
Michigan	99	100	99	71	50	969	793	698	452	287
Wisconsin	15	17	11	8	9	168	158	90	74	65
Nebraska	60	79	82	86	92	933	923	1,036	1,021	1,062
Montana	30	32	32	28	37	309	348	364	258	362
Wyoming	29	36	37	44	49	364	388	431	462	499
Idaho	36	18	29	27	52	456	108	381	297	565
Colorado	130	211	218	179	230	1,640	2,912	2,774	2,394	2,880
Utah	69	51	55	51	46	1,064	415	677	637	564
California	76	46	59	49	48	488	369	476	638	544
Other States	60	52	62	63	82	563	469	501	602	659
United States	647	677	721	644	717	7,381	7,223	7,753	7,101	7,672
Canada, for United States factories	6	10	11	2	8	57	77	69	10	42

State	Yield per acre 1925	Yield per acre 1926	Yield per acre 1927	Yield per acre 1928	Yield per acre 1929	Price per ton received by producers 1925	Price per ton received by producers 1926	Price per ton received by producers 1927	Price per ton received by producers 1928	Price per ton received by producers 1929	Value 1925	Value 1926	Value 1927	Value 1928	Value 1929
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Ohio	9.9	9.7	8.8	7.0	8.5	6.90	7.00	7.00	7.13	------	2,945	2,383	2,272	1,897	------
Michigan	9.8	7.9	7.0	6.4	5.7	7.05	7.00	7.16	7.22	------	6,833	5,552	4,996	3,263	------
Wisconsin	11.2	9.3	8.2	9.2	7.2	7.25	7.24	7.00	7.35	------	1,218	1,141	633	543	------
Nebraska	15.6	11.7	12.6	11.9	11.5	5.97	7.89	7.96	6.98	------	5,574	7,274	8,241	7,127	------
Montana	10.3	10.9	11.4	9.2	9.7	6.35	8.09	8.22	7.36	------	1,960	2,814	2,996	1,897	------
Wyoming	12.6	10.5	11.6	10.5	10.2	6.18	7.06	7.67	7.44	------	2,253	2,743	3,303	2,210	------
Idaho	12.7	6.0	13.1	11.0	11.0	6.24	6.91	7.50	7.21	------	2,846	744	2,854	3,326	------
Colorado	12.6	13.8	12.7	13.4	12.5	5.98	7.92	7.84	6.97	------	9,815	23,050	21,758	16,687	------
Utah	15.4	8.1	12.3	12.5	12.2	6.03	6.97	7.03	7.03	------	6,416	2,894	4,761	4,478	------
California	6.4	8.0	8.1	13.0	11.2	8.21	9.25	9.28	8.03	------	4,005	3,411	4,418	5,121	------
Other States	9.4	9.0	8.1	9.6	8.0	5.83	6.31	6.43	6.53	------	3,282	2,958	3,223	3,928	------
United States	11.4	10.7	10.8	11.0	10.7	6.39	7.61	7.67	7.11	------	47,147	54,964	59,455	50,477	------
Canada for United States factories	9.5	7.7	6.3	5.0	5.4	------	------	------	------	------	------	------	------	------	------

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TABLE 151.—*Sugar beets: Production, United States, 1911–1929* [1]

Year	Acreage	Yield	Production	Price per ton	Value	Year	Acreage	Yield	Production	Price per ton	Value
	1,000 acres	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 dollars*		*1,000 acres*	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 dollars*
1911	474	10. 7	5, 062	5. 50	27, 841	1921	815	9. 6	7, 782	6. 35	49, 392
1912	555	10. 2	5, 648	5. 82	32, 871	1922	530	9. 8	5, 183	7. 91	41, 017
1913	580	10. 1	5, 886	5. 69	33, 491	1923	657	10. 7	7, 006	8. 99	62, 965
1914	483	11. 6	5, 585	5. 45	30, 438	1924	815	9. 2	7, 489	7. 99	59, 838
1915	611	10. 7	6, 511	5. 67	36, 950	1925	647	11. 4	7, 381	6. 39	47, 147
1916	665	9. 4	6, 228	6. 12	38, 139	1926	677	10. 7	7, 223	7. 61	54, 964
1917	665	9. 0	5, 980	7. 39	44, 192	1927	721	10. 8	7, 753	7. 67	59, 455
1918	594	10. 0	5, 949	10. 00	59, 494	1928	644	11. 0	7, 101	7. 11	50, 477
1919	692	9. 3	6, 421	11. 74	75, 420	1929 [2]	717	10. 7	7, 672	7. 52	57, 679
1920	872	9. 8	8, 538	11. 63	99, 324						

Bureau of Agricultural Economics.

[1] Most years from 1911–1923 include a small unknown quantity of beets grown in Canada for Michigan factories.
[2] Preliminary.

TABLE 152.—*Beet sugar: Production, United States, 1911–1929* [1]

Year [2]	Factories operating	Acreage from which beets were harvested [3]	Beets paid for by factories	Beets sliced	Sugar produced (chiefly refined)	Analysis of beets: Purity coefficient [4]	Analysis of beets: Percentage of sucrose [5]	Recovery of sucrose from beets [6]: Paid for	Recovery of sucrose from beets [6]: Sliced	Sugar produced per ton of beets: Paid for	Sugar produced per ton of beets: Sliced
	Number	*1,000 acres*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Pounds*	*Pounds*
1911	66	474	------	5, 062	600	82. 21	15. 89	------	11. 84	------	237
1912	73	555	------	5, 224	693	84. 49	16. 31	------	13. 26	------	265
1913	71	580	5, 886	5, 659	733	83. 22	15. 78	12. 45	12. 96	249	259
1914	60	483	5, 585	5, 288	722	83. 89	16. 38	12. 93	13. 65	259	273
1915	67	611	6, 511	6, 150	874	84. 38	16. 49	13. 42	14. 21	268	284
1916	74	665	6, 228	5, 920	821	84. 74	16. 30	13. 18	13. 86	264	277
1917	91	665	5, 980	5, 626	765	83. 89	16. 28	12. 79	13. 60	256	272
1918	89	594	5, 949	5, 578	761	84. 70	16. 18	12. 79	13. 64	256	273
1919	89	692	6, 421	5, 888	726	82. 84	14. 48	11. 31	12. 34	226	247
1920	97	872	8, 538	7, 991	1, 089	83. 96	15. 99	12. 75	13. 63	255	273
1921	92	815	7, 782	7, 414	1, 020	83. 09	15. 77	13. 11	13. 76	262	275
1922	81	530	5, 183	4, 963	675	83. 76	15. 44	13. 02	13. 61	260	272
1923	89	657	7, 006	6, 585	881	83. 43	15. 30	12. 57	13. 37	251	267
1924	90	817	7, 513	7, 075	1, 090	85. 03	17. 19	14. 51	15. 41	290	308
1925	88	653	7, 423	6, 993	913	82. 84	14. 86	12. 30	13. 06	246	261
1926	78	687	7, 300	6, 782	897	84. 03	14. 94	12. 29	13. 23	246	265
1927	83	732	7, 821	7, 413	1, 093	84. 60	16. 11	13. 98	14. 68	280	294
1928	82	646	7, 111	6, 880	1, 061	85. 52	16. 73	14. 92	15. 42	298	308
1929 [7]	------	725	7, 714	------	1, 041	------	15. 67	13. 49	------	270	------

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Figures for important States in recent years published in Crops and Markets, December, 1929, p. 475.
[2] Year shown is that in which beets were grown. Sugar-making campaign extendsi nto succeeding year.
[3] Including, in some years, a small acreage in Canada used by U. S. factories.
[4] Percentages of sucrose (pure sugar) in the total soluble solids of the beets.
[5] Based upon weight of beets sliced, except possibly in a very few factories.
[6] Sucrose actually extracted byf actories (as percentage of weight of beets).
[7] Preliminary.

TABLE 153.—*Cane sugar: Production in Louisiana, 1911–1929*

Year [1]	Factories operating	Cane used for sugar: Acreage	Cane used for sugar: Average yield per acre	Cane used for sugar: Production	Sugar produced: As made	Sugar produced: Equivalent refined [2]	Recovery of equivalent refined sugar from cane ground [3]	Sugar made per ton of cane	Molasses made: Total [4]	Molasses made: Per ton of sugar made	Molasses made: Per ton of cane used
	Number	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Per cent*	*Pounds*	*Gallons*	*Gallons*	*Gallons*
1911	188	310,000	19.0	5,887,292	352,874	328,879	5.59	120	35,062,525	99	6.0
1912	126	197,000	11.0	2,162,574	153,573	143,130	6.62	142	14,302,169	93	6.6
1913	153	248,000	17.0	4,214,000	292,698	272,795	6.47	139	24,046,320	82	5.7
1914	149	213,000	15.0	3,199,000	242,700	226,200	7.07	152	17,177,443	71	5.4
1915	136	183,000	11.0	2,018,000	137,500	128,200	6.35	135	12,743,000	93	6.3
1916	150	221,000	18.0	4,072,000	303,900	283,200	6.95	149	26,154,000	86	6.4
1917	140	244,000	15.6	3,813,000	243,600	227,000	5.95	128	30,728,000	126	8.1
1918	134	231,200	18.0	4,170,000	280,900	261,800	6.28	135	28,049,000	100	6.7
1919	121	179,900	10.5	1,883,000	121,000	112,800	5.99	129	12,991,000	107	6.9
1920	122	182,843	13.6	2,492,524	169,127	157,626	6.32	136	16,856,867	100	6.8
1921	124	226,366	18.5	4,180,780	324,431	302,370	7.23	155	25,423,341	78	6.1
1922	112	241,433	15.6	3,778,110	295,095	275,029	7.28	156	22,718,640	77	6.0
1923	105	217,259	11.1	2,386,650	162,023	151,005	6.33	136	15,719,400	97	6.6
1924	82	163,000	7.6	1,228,000	88,000	82,000	6.68	144	9,590,000	109	7.8
1925	91	190,000	14.0	2,645,000	139,000	130,000	4.91	105	17,783,000	128	6.7
1926	54	128,000	6.8	864,000	47,000	44,000	5.09	109	6,614,000	141	7.7
1927	46	73,000	13.4	962,000	71,000	66,000	6.86	147	6,624,000	93	6.9
1928	55	115,000	16.2	1,860,000	132,000	123,000	6.61	142	13,535,000	103	7.3
1929 [5]		173,000	16.0	2,768,000	208,000	194,000	7.01	150	15,750,000	76	5.7

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Sugar campaign, usually not ended before February following season of growth of cane.
[2] One ton of sugar as made is assumed to be equivalent to 0.932 tons of refined as tentatively recommended by the joint committee on sugar statistics of the Department of Commerce and the Department of Agriculture.
[3] Based upon tonnage of cane used.
[4] Figures for molasses, 1911–1914, are as reported by the Louisiana Sugar Planters' Association: Figures for later years as reported by Division of Crop and Livestock Estimates.
[5] Preliminary.

TABLE 154.—*Cane sugar: Production of Hawaii, 1914–1929*

Year ending Sept. 30	Total acreage in cane	Cane used for sugar: Acreage harvested	Cane used for sugar: Average yield per acre	Cane used for sugar: Production	Sugar produced: As made	Sugar produced: Equivalent refined [1]	Sugar made per short ton of cane	Recovery of equivalent refined sugar from cane ground [2]
	Acres	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Pounds*	*Per cent*
1914		112,700	43	4,900,000	612,000	573,000	250	11.69
1915	239,800	113,200	46	5,185,000	646,000	605,000	249	11.67
1916	246,332	115,419	42	4,859,424	592,763	554,708	244	11.42
1917	245,100	123,900	42	5,220,000	644,663	603,276	247	11.56
1918	276,800	119,800	41	4,855,000	576,700	539,676	238	11.12
1919	239,900	119,700	40	4,744,000	600,312	561,772	253	11.84
1920	247,900	114,100	39	4,473,000	555,727	520,049	248	11.63
1921	236,500	113,100	41	4,657,000	521,579	488,094	224	10.48
1922	229,000	124,000	41	5,088,000	592,000	554,000	233	10.89
1923	235,000	114,000	40	4,560,000	537,000	503,000	235	11.03
1924	232,000	111,000	51	5,661,000	691,000	647,000	244	11.43
1925	241,000	122,000	52	6,297,000	769,000	720,000	244	11.43
1926 [3]	237,774	122,309	53	6,495,686	787,246	736,705	242	11.34
1927 [3]	234,800	124,542	56	6,992,082	811,333	759,245	232	10.86
1928 [3]	240,769	131,534	59	7,707,330	896,918	839,336	233	10.89
1929 [3]					913,670	855,012		

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] 1 ton of sugar as made is assumed to be equivalent to 0.9358 tons of refined, as tentatively recommended by the joint committee on sugar statistics of the Department of Commerce and the Department of Agriculture.
[2] Based upon tonnage of cane used.
[3] Data collected through the Hawaiian Sugar Planters' Association.

TABLE 155.—*Sugar: Production in the United States and its possessions, 1909–1929*

Year beginning July	Total cane and beet sugar (refined) [1]	Beet sugar (chiefly refined)	Cane sugar (chiefly raw)				
			Continental United States	Porto Rico	Hawaii	Philippine Islands [2]	Total
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1909	1, 765, 011	512, 469	331, 726	346, 786	517, 090	140, 783	1, 336, 385
1910	1, 856, 530	510, 172	355, 040	349, 840	566, 821	164, 658	1, 436, 359
1911	2, 036, 018	599, 500	360, 874	371, 076	595, 038	205, 046	1, 532, 034
1912	2, 057, 179	692, 556	162, 573	398, 004	546, 524	345, 077	1, 452, 178
1913	2, 304, 454	733, 401	300, 538	351, 666	612, 000	408, 339	1, 672, 543
1914	2, 282, 021	722, 054	246, 620	346, 490	646, 000	421, 192	1, 660, 302
1915	2, 404, 018	874, 220	138, 620	483, 590	592, 763	412, 274	1, 627, 247
1916	2, 590, 239	820, 657	310, 900	503, 081	644, 663	425, 266	1, 883, 910
1917	2, 411, 263	765, 207	245, 840	453, 794	576, 700	474, 745	1, 751, 079
1918	2, 399, 820	760, 950	284, 400	406, 002	600, 312	453, 346	1, 744, 060
1919	2, 259, 513	726, 451	122, 125	485, 071	555, 727	466, 912	1, 629, 835
1920	2, 779, 413	1, 089, 021	176, 114	489, 818	521, 579	608, 499	1, 796, 010
1921	2, 769, 970	1, 020, 489	327, 701	408, 325	592, 000	533, 189	1, 861, 215
1922	2, 260, 865	675, 000	295, 735	379, 172	537, 000	475, 325	1, 687, 232
1923	2, 604, 292	881, 000	164, 823	447, 570	691, 000	529, 091	1, 832, 484
1924	3, 252, 954	1, 090, 000	88, 483	660, 411	769, 000	779, 510	2, 297, 404
1925	2, 923, 225	913, 000	139, 381	603, 240	787, 246	607, 362	2, 137, 229
1926	3, 019, 707	897, 000	47, 166	629, 134	811, 333	766, 902	2, 254, 535
1927	3, 468, 969	1, 093, 000	70, 792	748, 677	896, 918	807, 814	[3] 822, 621
1928	3, 371, 720	1, 061, 000	132, 053	586, 761	913, 670	[3] 822, 621	2, 524, 201
1929 (preliminary)	3, 585, 532	1, 041, 000	208, 271	743, 147	[4] 913, 000	[3] 840, 000	2, 704, 418

Bureau of Agricultural Economics. Cane sugar production 1909–1910 from Willett & Gray; 1911 and subsequently from United States Department of Agriculture. Hawaiian production from Hawaiian Sugar Planters' Association. Figures for earlier years appear in previous issues of the Yearbook.

[1] Cane sugar, raw, converted to refined basis by multiplying by the following factors: Louisiana and other States, 0.932; Porto Rico, 0.9393; Hawaii, 0.9358; Philippine Islands, 0.95.
[2] Exports 1909–1911, production 1912 and subsequently.
[3] Unofficial estimate of commercial crop.
[4] Unofficial.

TABLE 156.—*Sugar beets: Acreage, yield per acre and production in specified countries, 1927–1929*

Country	Acreage			Yield per acre			Production		
	1927	1928	1929, preliminary	1927	1928	1929, preliminary	1927	1928	1929, preliminary
	1,000 acres	*1,000 acres*	*1,000 acres*	*Short tons*	*Short tons*	*Short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Canada	44	51	43	8. 9	8. 5	7. 8	391	433	334
United States	721	644	717	10. 8	11. 0	10. 7	7, 753	7, 101	7, 672
United Kingdom	233	178	231	7. 2	8. 8	9. 0	1, 683	1, 561	2, 089
Sweden	101	100	62	10. 8	12. 1	11. 7	1, 095	1, 208	726
Denmark	105	113	74	11. 5	12. 5	12. 2	1, 207	1, 414	904
Netherlands	173	162	133	11. 6	15. 6	13. 6	2, 013	2, 523	1, 808
Belgium	175	158	141	12. 5	12. 8	11. 6	2, 186	2, 015	1, 639
France	590	621	607	11. 2	8. 9	9. 7	6, 616	5, 521	5, 910
Spain	154	146	153	10. 9	10. 8		1, 675	1, 584	
Italy	219	285	296	10. 1	11. 1	10. 7	2, 222	3, 154	3, 155
Germany	1, 072	1, 123	1, 126	11. 2	10. 8	9. 8	11, 964	12, 137	11, 056
Austria	60	70	75	13. 3	11. 4	8. 9	797	800	664
Czechslovakia	712	635	609	12. 3	10. 8	10. 8	8, 773	6, 863	6, 598
Hungary	159	165	185	10. 1	9. 6	8. 6	1, 604	1, 585	1, 591
Yugoslavia	102	140	150	6. 5	7. 3	7. 7	660	1, 024	1, 154
Rumania	209	141	122	6. 6	8. 2	7. 3	1, 383	1, 163	893
Poland	499	579	591	8. 0	9. 3		3, 990	5, 404	
Russia	1, 644	1, 901	1, 937	6. 8	5. 6		11, 130	10, 690	
Other [1]	73	74	69	8. 1	6. 2	8. 5	592	462	586
Total countries reporting for all years	7, 045	7, 286	7, 421				50, 939	48, 964	46, 779
Estimated world total [2]	7, 045	7, 286	7, 421				67, 734	66, 642	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture.

[1] Includes Irish Free State, Switzerland, Bulgaria, Latvia, Finland, and Australia.
[2] Exclusive of acreage and production in minor producing countries for which no data are available.

TABLE 157.—*Sugar: Production in specified countries, average 1909–1910 to 1913–1914, average 1921–22 to 1925–26, annual 1927–28 to 1929–30*

BEET SUGAR IN TERMS OF RAW SUGAR

Country	Average 1909–10 to 1913–14 [1]	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30 preliminary
NORTH AMERICA	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Canada	11,782	31,908	34,653	36,735	[2] 36,000
United States	655,000	984,600	1,175,000	1,141,000	1,119,000
Total	666,782	1,016,508	1,209,653	1,177,735	1,155,000
EUROPE					
England and Wales	[3] 3,084	24,385	222,271	237,389	319,000
Scotland	(4)	[5] 163	8,013	2,650	
Irish Free State	(4)	(4)	22,487	24,295	21,160
Sweden	153,739	175,564	160,204	177,318	119,930
Denmark	127,091	142,726	150,729	178,630	146,459
Netherlands	246,341	324,273	280,190	343,478	277,000
Belgium	278,837	346,194	296,234	303,213	276,000
France	807,887	609,604	936,872	982,021	990,000
Spain	115,727	199,414	205,446	236,231	220,000
Italy	208,675	309,343	312,311	429,478	474,000
Switzerland	3,784	6,698	7,578	7,738	6,300
Germany	[6] 2,340,268	1,557,556	1,846,658	2,055,105	2,032,366
Austria	79,528	53,192	121,257	118,277	130,071
Czechslovakia	1,221,274	1,176,255	1,372,197	1,161,824	1,087,346
Hungary	175,783	139,801	205,799	241,662	265,900
Yugoslavia	41,459	63,482	86,250	131,339	143,000
Bulgaria	4,376	22,044	43,266	30,071	38,580
Rumania	[7] 88,245	76,698	158,700	133,000	86,000
Poland	702,626	421,338	658,033	823,173	918,600
Latvia	(4)	(4)	1,160	1,797	4,960
Finland	(4)	1,407	4,818	3,315	3,300
Russia, European	1,557,114	474,700	1,473,454	1,364,100	1,146,000
Total	8,155,838	6,124,837	8,573,927	8,986,104	8,705,972
OCEANIA					
Australia	[5] 1,030	3,021	2,000	2,400	----------
World total, beet sugar [8]	8,825,650	7,144,366	9,785,580	10,166,239	9,862,972

CANE SUGAR (RAW)

Country	Average 1909–10 to 1913–14 [1]	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30 preliminary
NORTH AND CENTRAL AMERICA AND WEST INDIES					
United States	302,150	203,224	70,792	132,053	208,271
Hawaii	567,495	675,249	896,918	[2] 929,600	[2] 913,000
Porto Rico	361,974	499,751	748,677	586,761	743,147
Virgin Islands	5,482	5,535	[2] 11,829	[2] 4,500	[2] 7,800
Central America:					
Guatemala	8,998	23,733	[2] 32,247	[2] 36,000	[2] 39,000
Nicaragua	3,742	14,457	[2] 14,200	[2] 15,000	----
Salvador	[9] 10,834	21,500	----	----	----
Mexico	163,388	179,150	[2] 196,240	[2] 200,619	[2] 202,000
West Indies (British):					
Antigua	12,919	13,267	[2] 22,188	[2] 12,258	[2] 16,800
Barbadoes	27,788	51,607	[2] 59,479	[2] 72,632	[2] 65,000
Jamaica	23,856	39,883	[2] 70,800	[2] 65,464	[2] 67,000
St. Christopher	13,252	13,985	[2] 21,776	[2] 20,000	[2] 18,560
Trinidad and Tobago	51,275	66,483	[2] 91,337	[2] 100,717	[2] 95,000
Cuba	2,287,652	4,908,638	4,526,879	5,775,179	5,090,944
Dominican Republic	[7] 104,664	281,846	405,885	[2] 396,575	[2] 421,044
Haiti	(10)	10,158	[2] 18,331	[2] 18,000	[2] 16,000

1 Figures for Europe are estimates for territory within present boundaries.
2 Unofficial estimate.
3 2-year average.
4 No sugar produced.
5 1 year only.
6 1 year only, 1912–13. According to statistics of the German Sugar Association the 1912–13 sugar production was greater than that of any other year.
7 4-year average.
8 Exclusive of production in minor producing countries for which no data are available.
9 3-year average.
10 Too small to report.

TABLE 157.—*Sugar: Production in specified countries, average 1909–1910 to 1913–1914, average 1921–22 to 1925–26, annual 1927–28 to 1929–30*—Con.

CANE SUGAR (RAW)—Continued

Country	Average 1909–10 to 1913–14	Average 1921–22 to 1925–26	1927–28	1928–29	1929–30 preliminary
NORTH AND CENTRAL AMERICA AND WEST INDIES—continued					
West Indies (French):	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Guadeloupe	40,810	32,674	37,477	[2] 4,500	[2] 30,000
Martinique	42,782	33,573	[2] 43,028	[2] 42,600	[2] 43,000
Total, North and Central American countries and West Indies reporting, all years	4,013,885	7,038,756	7,253,883	8,397,458	7,976,506
EUROPE AND ASIA					
Spain	17,059	8,738	[2] 10,000	12,787	----------
India [11]	2,649,480	3,247,800	3,602,000	3,063,000	[2] 2,968,000
Formosa	192,299	473,631	620,276	[2] 864,333	[2] 854,000
Japan	75,718	98,400	[2] 129,797	[2] 132,720	----------
Java [12]	1,512,569	2,113,004	2,638,547	[2] 3,249,784	[2] 3,202,457
Philippine Islands	294,380	584,895	807,814	([13])	([13])
Total, European and Asiatic countries reporting, all years	4,354,348	5,834,435	6,860,823	7,177,117	7,024,457
SOUTH AMERICA					
Argentina	193,853	288,008	456,933	[2] 413,725	[2] 374,158
Brazil	[9] 332,813	909,079	[2] 727,618	[2] 756,000	[2] 767,000
British Guiana	[9] 112,297	112,297	128,388	130,462	[2] 122,356
Dutch Guiana	13,235	12,469	[2] 15,120	[2] 17,000	[2] 14,000
Ecuador	[3] 6,289	17,603	[2] 22,500	[2] 25,370	[2] 25,000
Peru	202,518	354,567	[2] 415,211	[2] 405,154	[2] 414,000
Venezuela	3,187	21,423	[2] 22,305	[2] 22,000	[2] 25,000
Total, South America	864,192	1,715,446	1,788,075	1,769,711	1,741,514
AFRICA					
Egypt	67,127	100,264	[2] 100,734	[2] 100,800	[2] 101,000
Mauritius	233,671	243,069	[2] 238,500	[2] 277,482	[2] 265,000
Union of South Africa	88,165	182,418	[2] 247,273	[2] 296,000	[2] 302,325
Portuguese East Africa	26,460	53,219	[2] 79,366	[2] 87,300	[2] 56,000
Reunion	41,653	52,015	[2] 55,084	[2] 58,000	[2] 60,000
Madagascar	([10])	2,168	[2] 3,858	[2] 4,894	----------
Total, Africa	457,076	630,985	720,957	819,582	784,325
OCEANIA					
Australia	216,331	411,638	578,999	[2] 602,134	[2] 579,040
Fiji	84,629	71,984	[2] 106,528	[2] 103,000	[2] 95,000
Total, Oceania	300,960	483,622	685,527	705,134	674,040
Total cane-sugar producing countries reporting, all years	9,990,461	15,703,244	17,309,265	18,869,002	18,200,842
Estimated world total cane-sugar [8]	10,539,000	16,622,000	18,481,000	20,058,000	19,406,000
Total world cane and beet sugar production in countries reporting, all years	18,814,111	22,847,610	27,094,845	29,035,241	28,063,814
Estimated world total, cane and beet sugar [8]	19,363,000	23,766,000	28,267,000	30,224,000	29,269,000

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Figures are for the crop years 1909–10 to 1929–30 for the countries in which the sugar-harvesting season begins in the fall months and is completed during the following calendar year, except in certain cane-sugar producing countries where the season begins in May or June and is completed in the same calendar year. Production in these countries is for the calendar years 1909 to 1929.

[2] Unofficial estimate.
[3] 2-year average.
[8] Exclusive of production in minor producing countries for which no data are available.
[9] 3-year average.
[10] Too small to report.
[11] The figures quoted for India are for the production of gur, a low grade of sugar polarizing between 50° and 60°. This sugar is mostly consumed by the natives.
[12] All grades of sugar reduced to terms of head sugar, a grade of sugar which contains at least 96.5 per cent of sucrose.
[13] Figures for the total crop are not yet available. Trade reports place the 1928–29 commercial crop at 830,000 short tons and that of 1929–30 at 840,000 short tons.

TABLE 158.—*Sugar: Production, trade, and supply available for consumption in continental United States, 1909–1929*

IN TERMS OF RAW SUGAR

Year beginning July 1	Production[1]	Brought in from insular possessions[2]	Imports as sugar[3]	Domestic exports as sugar[4]	Exports in other forms[5]	Available for consumption[6]	
						Total	Per capita
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Pounds*
1909	882, 630	927, 752	1, 934, 754	72, 382	24, 351	3, 648, 403	79. 7
1910	903, 475	943, 701	1, 845, 279	36, 597	15, 966	3, 639, 891	78. 3
1911	1, 005, 337	1, 187, 663	1, 832, 424	50, 380	15, 160	3, 959, 883	83. 9
1912	907, 070	1, 026, 972	2, 266, 426	30, 963	19, 217	4, 150, 288	86. 6
1913	1, 088, 944	936, 376	2, 463, 252	37, 190	11, 892	4, 439, 489	91. 3
1914	1, 022, 828	1, 098, 314	2, 529, 963	302, 641	13, 585	4, 334, 878	87. 9
1915	1, 078, 407	1, 102, 057	2, 689, 067	882, 864	12, 213	3, 974, 453	79. 4
1916	1, 193, 107	1, 203, 938	2, 527, 984	676, 752	29, 211	4, 219, 066	83. 2
1917	1, 068, 437	975, 684	2, 344, 816	305, 429	46, 131	4, 037, 377	78. 5
1918	1, 102, 421	1, 073, 944	2, 799, 962	568, 566	36, 747	4, 371, 013	83. 8
1919	903, 060	975, 735	3, 812, 955	776, 502	98, 386	4, 816, 862	91. 1
1920	1, 346, 811	1, 076, 342	3, 228, 279	319, 589	89, 491	5, 242, 852	97. 6
1921	1, 424, 726	1, 340, 867	3, 940, 777	1, 085, 349	31, 397	5, 589, 624	102. 4
1922	1, 021, 360	1, 235, 049	4, 068, 205	412, 196	12, 568	5, 899, 849	106. 5
1923	1, 111, 898	1, 274, 870	3, 436, 955	152, 883	24, 617	5, 646, 223	100. 2
1924	1, 260, 000	1, 645, 319	3, 931, 282	273, 470	22, 436	6, 540, 695	114. 2
1925	1, 121, 000	1, 981, 482	3, 895, 947	325, 804	24, 998	6, 647, 627	114. 4
1926	1, 011, 000	1, 689, 347	3, 968, 880	124, 555	26, 303	6, 518, 486	110. 6
1927	1, 246, 000	2, 051, 659	3, 415, 830	115, 566	29, 833	6, 568, 090	110. 1
1928	1, 273, 000	1, 974, 899	4, 115, 601	139, 324	31, 894	7, 192, 282	119. 2
1929	1, 327, 000	------------	------------	------------	------------	------------	------------

IN TERMS OF REFINED SUGAR[8]

Year beginning July 1	Production[1]	Brought in from insular possessions[2]	Imports as sugar[3]	Domestic exports as sugar[4]	Exports in other forms[5]	Total	Per capita
1921	1, 325, 906	1, 260, 894	3, 686, 397	1, 009, 377	29, 182	5, 234, 638	95. 9
1922	950, 625	1, 161, 351	3, 805, 745	383, 439	11, 682	5, 522, 600	99. 7
1923	1, 034, 615	1, 198, 777	3, 214, 883	142, 217	22, 943	5, 283, 115	93. 7
1924	1, 172, 000	1, 547, 587	3, 674, 563	254, 391	20, 911	6, 118, 848	106. 8
1925	1, 043, 000	1, 859, 332	3, 634, 323	303, 073	23, 298	6, 210, 284	106. 8
1926	941, 000	1, 588, 981	3, 714, 054	115, 865	24, 514	6, 103, 656	103. 6
1927	1, 159, 000	1, 930, 732	3, 196, 443	107, 704	27, 805	6, 150, 666	103. 1
1928	1, 184, 000	1, 858, 331	3, 851, 311	129, 846	29, 726	6, 734, 070	111. 6
1929	1, 235, 000	------------	------------	------------	------------	------------	------------

Bureau of Agricultural Economics. Trade figures compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926, January and June issues, 1927–29, and official records of the Bureau of Foreign and Domestic Commerce.

[1] Beet and cane sugar only.
[2] Duty free, from Hawaii, Porto Rico, the Philippine Islands, and from the Virgin Islands since 1916.
[3] No account taken of sugar imported in other forms. Imports from the Philippine Islands excluded, reexports deducted.
[4] Shipments to Hawaii and Porto Rico included. Direct exports to foreign countries from Hawaii and Porto Rico excluded.
[5] Sugar used in the manufacture of other commodities for export on which drawback was paid.
[6] No account taken of stocks at the beginning or end of year.
[7] Not available.
[8] Raw sugar converted to refined by multiplying by the following factors: Cuba and Hawaii, 0.9358; Porto Rico, 0.9393; Philippines, 0.95; all others (Santo Domingo, British West Indies, Louisiana, etc.), 0.932.

TABLE 159.—*Sugar: International trade, average 1909–1913, annual 1926–1928*

Average	Year ended Dec. 31							
	Average 1909–1913		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Cuba	656	1, 991, 912	595	5, 227, 219	324	4, 645, 002	----------	----------
Dutch East Indies	3, 606	1, 409, 616	3, 372	1, 914, 463	3, 000	2, 202, 130	[1] 211	[1] 2, 827, 249
Czechoslovakia	0	0	68	1, 019, 467	2, 832	615, 583	77	819, 546
Philippine Islands	3, 950	179, 432	1, 352	453, 301	2, 509	609, 929	4, 887	628, 242
Netherlands	82, 721	200, 490	433, 744	347, 451	293, 131	307, 733	307, 109	227, 232
Peru	726	146, 736	22	364, 921	27	331, 166	24	337, 270
Dominican Republic	[2] 766	92, 351	191	372, 195	189	326, 166	17	594, 470
Mauritius	[3] 2	226, 255	1	199, 754	[4] 3	[4] 251, 313	----------	----------
Poland	0	0	61	293, 973	64	222, 966	38	204, 675
Belgium	7, 892	154, 476	56, 494	176, 594	90, 881	116, 251	86, 338	109, 902
Germany	3, 486	873, 161	47, 668	254, 125	121, 983	164, 174	124, 166	83, 803
British Guiana	[3] 6, 112	106, 196	446	94, 856	455	122, 770	536	128, 449
Australia	76, 233	268	[4] 4, 069	[4] 129, 708	[4] 32	[4] 143, 334	----------	----------
Hungary	[5] 3, 942	[5] 848, 830	138	72, 986	327	74, 015	609	78, 375
Fiji	[6] 386	78, 817	136	63, 830	134	81, 483	----------	----------
Trinidad and Tobago	522	43, 755	1, 408	73, 560	1, 618	46, 822	----------	----------
Reunion	[6] 2	41, 658	[4] 0	[4] 69, 790	[4] 0	[4] 69, 183	----------	----------
Jamaica	395	14, 494	[4] 750	[4] 53, 933	[4] 1, 120	[4] 55, 774	----------	----------
Union of South Africa	29, 694	675	4, 654	65, 289	3, 061	60, 164	17, 958	84, 154
Formosa	554	5, 744	[4] 31, 924	[4] 14, 362	[4] 25, 083	[4] 13, 199	----------	----------
Russia	3, 744	293, 514	[4] 2, 764	[4] 82, 788	[4] 8, 689	[4] 121, 173	----------	----------
PRINCIPAL IMPORTING COUNTRIES								
United States	2, 122, 517	39, 684	4, 710, 099	106, 893	4, 215, 773	125, 323	3, 858, 804	122, 587
United Kingdom	1, 853, 605	32, 603	1, 972, 516	86, 979	1, 892, 705	94, 915	2, 151, 712	83, 707
British India	715, 990	26, 611	875, 927	41, 993	840, 224	43, 374	930, 251	44, 674
China	343, 622	14, 933	777, 000	819	668, 240	2, 544	----------	----------
Canada	297, 893	820	580, 234	144, 938	494, 397	101, 116	477, 711	27, 555
France	186, 198	206, 897	486, 188	214, 110	392, 317	234, 988	485, 631	283, 820
Japan	176, 942	60, 204	504, 588	204, 206	468, 188	179, 300	420, 051	339, 508
Switzerland	118, 201	0	142, 015	66	137, 422	57	158, 532	85
British Malaya	----------	----------	121, 969	32, 070	124, 038	26, 653	125, 173	31, 352
Austria	0	0	114, 124	636	108, 132	370	----------	----------
Chile	84, 965	90	135, 962	[4] 88	105, 175	----------	141, 437	----------
Irish Free State	0	0	101, 855	0	81, 506	0	90, 115	0
Morocco	61, 402	0	109, 088	0	113, 008	0	----------	----------
Finland	50, 077	0	37, 469	0	73, 489	0	101, 485	0
New Zealand	62, 962	[3] 13, 478	88, 999	713	70, 122	641	89, 497	867
Norway	52, 326	0	81, 797	0	78, 839	0	80, 089	0
Persia [7]	109, 352	[3] 557	77, 613	117	79, 754	8	----------	----------
Portugal	39, 631	0	[4] 85, 488	[4] 85	----------	----------	----------	----------
Italy	9, 249	302	22, 798	8, 058	77, 291	5, 073	118, 495	4
Denmark	21, 814	22, 536	22, 482	1, 100	12, 632	11, 920	44, 896	606
Greece	11, 718	0	53, 065	0	66, 460	0	67, 072	0
Sweden	1, 672	1	117, 078	4	124, 868	13	103, 528	18
Egypt	43, 020	8, 086	61, 973	, 670	57, 119	6, 367	77, 881	5, 704
Algeria	37, 908	0	53, 578	145	62, 316	[4] 88	70, 785	----------
Argentina	51, 690	72	1, 498	162	853	69, 045	----------	----------
Anglo-Egyptian Sudan	13, 764	0	24, 625	0	19, 570	0	26, 784	0
Total 47 countries	6, 691, 907	7, 135, 254	11, 949, 885	12, 196, 417	10, 919, 900	11, 482, 155	10, 161, 899	7, 063, 854

Bureau of Agricultural Economics. Official sources except where otherwise noted.

The following kinds and grades have been included under the head of sugar: Brown, white, candied, caramel, chancaca (Peru), crystal cube, maple, muscovado, panela. The following have been excluded: "Candy" (meaning confectionery), confectionery, glucose, grape sugar, jaggery, molasses, and sirups.

[1] Java and Madura only.
[2] One year only.
[3] Four-year average.
[4] International Yearbook of Agricultural Statistics.
[5] Average for Austria-Hungary.
[6] Three-year average.
[7] Year ended Mar. 20.

TABLE 160.—*Sugar, raw; cane, and beet: World production, 1909–10 to 1929–30*

Year [1]	Estimated world total	Estimated world total cane sugar	Estimated world total beet sugar	Chief producing countries: United States [2]	Cuba	India [3]	Java [4]	Germany [5]	Czechoslovakia
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
1909–10	16,828	9,670	7,158	883	2,021	2,481	1,369	2,147	------
1910–11	18,834	9,870	8,964	903	1,661	2,587	1,411	2,770	------
1911–12	17,908	10,622	7,286	1,005	2,124	2,745	1,617	1,552	------
1912–13	20,542	10,896	9,646	907	2,720	2,862	1,550	2,902	------
1913–14	21,154	11,640	9,514	1,089	2,909	2,573	1,616	2,886	------
1914–15	20,875	11,952	8,923	1,023	2,922	2,736	1,549	2,721	------
1915–16	18,885	12,278	6,607	1,078	3,398	2,949	1,454	1,678	------
1916–17	18,592	13,255	5,337	1,193	3,422	3,095	1,797	1,721	------
1917–18	20,293	14,790	5,503	1,068	3,890	3,838	2,009	1,726	------
1918–19	18,791	14,076	4,715	1,102	4,491	2,753	1,960	1,297	[6] 714
1919–20	17,998	14,337	3,661	903	4,184	3,404	1,473	774	553
1920–21	19,563	14,225	5,338	1,347	4,406	2,825	1,681	1,195	797
1921–22	20,577	15,100	5,477	1,425	4,517	2,928	1,853	1,434	731
1922–23	20,855	15,129	5,726	1,021	4,083	3,410	1,994	1,604	811
1923–24	22,808	16,319	6,489	1,112	4,606	3,715	1,981	1,263	1,115
1924–25	26,636	17,729	8,907	1,260	5,812	2,852	2,201	1,724	1,574
1925–26	27,951	18,829	9,122	1,121	5,524	3,334	2,535	1,763	1,650
1926–27	26,541	18,093	8,448	1,011	5,050	3,659	2,175	1,834	1,153
1927–28	28,267	18,481	9,786	1,246	4,527	3,602	2,639	1,847	1,372
1928–29	30,224	20,058	10,166	1,273	5,775	3,063	[7] 3,250	2,055	1,162
1929–30 (preliminary)	29,269	19,406	9,863	1,327	5,091	2,968	[7] 3,202	[7] 2,032	[7] 1,087

Bureau of Agricultural Economics. Estimated world total sugar production for the period 1895–96 to 1908–09 in Agrictulural Yearbook, 1924, p. 808.

[1] Figures are for the crop years 1909–10 to 1929–30 for the countries in which the sugar production season begins in the fall months and is completed during the following calendar year except in the cane-sugar producing countries where the season begins in May or June and is completed in the same calendar year. Production in these countries is for the calendar years 1909 to 1929.
[2] Production of cane and beet sugar in terms of raw sugar.
[3] The figures quoted are the production of gur, a low grade of sugar polarizing between 50° and 60°.
[4] All grades of sugar reduced to terms of head sugar, a grade of sugar which contains at least 96.5 per cent sucrose.
[5] Figures for 1909–10 to 1917–18 are for pre-war boundaries.
[6] Bohemia, Moravia, and Silesia only.
[7] Unofficial estimate.

TABLE 161.—*Sugar, raw (96° centrifugal): Average wholesale price per pound New York, 1909–1929* [1]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [2]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	3.7	3.6	3.8	3.9	3.9	3.9	3.9	4.1	4.2	4.3	4.4	4.2	4.0
1910	4.1	4.2	4.4	4.3	4.3	4.2	4.3	4.4	4.3	3.9	3.9	4.0	4.2
1911	3.6	3.5	3.8	3.9	3.9	3.9	4.3	4.9	5.9	5.9	5.1	4.8	4.5
1912	4.4	4.6	4.5	4.1	4.0	3.9	3.9	4.1	4.3	4.1	4.0	4.0	4.2
1913	3.5	3.5	3.5	3.4	3.3	3.3	3.6	3.7	3.7	3.5	3.6	3.4	3.5
1914	3.3	3.4	3.0	3.0	3.2	3.3	3.3	5.7	5.8	4.4	3.9	3.9	3.8
1915	4.1	4.7	4.8	4.8	4.8	4.9	4.9	4.8	4.3	4.1	4.8	4.9	4.7
1916	4.6	4.9	5.6	6.2	6.4	6.3	6.3	5.6	5.6	6.3	6.2	5.3	5.8
1917	5.2	5.2	5.5	6.2	6.1	6.0	6.6	7.3	7.0	6.9	6.9	6.3	6.3
1918	6.0	6.0	6.0	6.0	6.0	6.0	6.1	6.1	7.0	7.3	7.3	7.3	6.4
1919	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	10.2	7.5
1920	13.0	11.4	11.9	17.7	20.8	19.7	17.6	13.4	10.7	8.3	6.8	5.3	13.0
1921	5.4	5.3	6.1	5.4	4.9	4.2	4.4	4.7	4.3	4.2	4.1	3.7	4.7
1922	3.6	3.8	3.9	4.0	4.1	4.6	5.2	5.2	4.8	5.4	5.6	5.7	4.7
1923	5.3	6.2	7.3	7.8	7.9	7.4	6.9	6.1	7.0	7.6	7.3	7.3	7.0
1924	6.7	7.2	6.9	6.4	5.6	5.1	5.1	5.4	6.0	6.0	5.8	5.3	6.0
1925	4.6	4.6	4.7	4.5	4.3	4.4	4.3	4.4	4.3	3.9	4.0	4.1	4.3
1926	4.2	4.2	4.0	4.1	4.2	4.1	4.2	4.2	4.4	4.6	4.7	5.1	4.3
1927	5.1	4.9	4.8	4.8	4.8	4.6	4.5	4.5	4.8	4.7	4.7	4.6	4.7
1928	4.5	4.3	4.5	4.5	4.5	4.3	4.2	4.1	4.2	3.9	3.9	3.9	4.2
1929	3.8	3.7	3.7	3.7	3.6	3.5	3.8	3.8	4.0	4.0	3.8	3.8	3.8

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890–1908 are available in 1924 Yearbook, p. 810, Table 388.

[1] Quotations are on basis of duty paid.
[2] Derived from the figures upon which the monthly averages are based.

TABLE 162.—*Sugar, granulated: Average retail price per pound, United States 1913–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1913	5.8	5.5	5.4	5.4	5.4	5.3	5.5	5.6	5.7	5.5	5.4	5.4	5.5
1914	5.2	5.2	5.1	5.0	5.0	5.1	5.2	7.9	8.0	7.2	6.2	6.1	5.9
1915	6.0	6.5	6.6	6.7	6.8	6.9	7.0	6.7	6.5	6.1	6.6	6.8	6.6
1916	6.7	6.9	7.5	8.0	8.6	8.7	8.8	8.5	7.7	8.2	8.6	8.3	8.0
1917	8.0	8.1	8.8	9.6	10.1	9.4	9.2	10.0	9.9	9.8	9.6	9.5	9.3
1918	9.5	10.6	9.2	9.1	9.1	9.1	9.2	9.3	9.6	10.6	10.8	10.8	9.7
1919	10.8	10.7	10.6	10.6	10.6	10.6	10.9	11.1	11.0	11.4	12.5	14.5	11.3
1920	17.8	18.8	18.7	20.2	25.4	26.7	26.5	22.9	18.3	13.9	12.8	10.5	19.4
1921	9.7	8.9	9.7	9.7	8.4	7.8	7.1	7.5	7.3	6.9	6.7	6.5	8.0
1922	6.2	6.4	6.5	6.7	6.6	7.1	7.6	8.1	7.9	7.9	8.1	8.3	7.3
1923	8.3	8.7	10.2	10.6	11.2	11.1	10.5	9.6	9.6	10.6	10.3	10.4	10.1
1924	10.2	10.3	10.4	9.9	9.2	8.3	8.4	8.2	8.6	8.8	8.8	8.8	9.2
1925	8.1	7.7	7.7	7.5	7.2	7.2	7.1	7.0	7.0	6.8	6.6	6.7	7.2
1926	6.7	6.7	6.7	6.6	6.7	6.9	6.9	7.0	7.0	7.1	7.1	7.3	6.9
1927	7.5	7.5	7.4	7.3	7.3	7.3	7.4	7.3	7.2	7.2	7.2	7.1	7.3
1928	7.1	7.1	7.1	7.1	7.2	7.3	7.3	7.1	7.0	6.9	6.8	6.7	7.1
1929	6.7	6.6	6.5	6.4	6.4	6.4	6.4	6.6	6.7	6.7	6.7	6.6	6.6

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics retail prices.

TABLE 163.—*Sorgo sirup: Acreage, production, and December 1 price, by States, 1926–1929*

State	Acreage				Average yield per acre				Production				Price per gallon received by producers Dec. 1			
	1926	1927	1928	1929[1]	1926	1927	1928	1929	1926	1927	1928	1929[1]	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Gals.*	*Gals.*	*Gals.*	*Gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Ohio	4	4	4	3	72	76	72	85	288	304	288	255	120	115	125	120
Indiana	2	2	2	2	92	80	96	90	184	160	192	180	105	110	115	110
Illinois	12	10	9	9	78	65	72	70	936	650	648	630	105	110	110	110
Wisconsin	2	2	2	2	66	55	64	70	132	110	128	140	140	135	140	140
Minnesota	2	2	2	2	80	70	84	80	160	140	168	160	120	110	120	120
Iowa	6	2	3	3	77	70	120	130	462	140	360	390	110	115	115	115
Missouri	25	22	22	21	78	79	85	75	1,950	1,738	1,870	1,575	100	100	100	105
Nebraska	2	2	2	2	64	80	83	90	128	160	166	180	100	105	105	100
Kansas	3	2	2	2	58	65	75	75	174	130	150	150	95	100	100	95
Virginia	12	10	12	10	100	92	86	81	1,200	920	1,032	810	95	95	95	95
West Virginia	8	6	7	7	97	89	88	90	776	534	616	630	110	110	110	110
North Carolina	30	22	20	20	91	92	86	94	2,730	2,024	1,720	1,880	90	90	90	85
South Carolina	22	26	18	19	77	71	72	68	1,694	1,846	1,296	1,292	75	75	80	80
Georgia	23	25	24	26	90	82	80	75	2,070	2,050	1,920	1,950	70	75	90	90
Kentucky	51	38	42	42	95	81	72	78	4,845	3,078	3,024	3,276	80	85	95	100
Tennessee	32	29	29	30	93	86	78	86	2,976	2,494	2,262	2,580	80	85	95	95
Alabama	36	35	30	28	100	82	75	70	3,600	2,870	2,250	1,960	80	80	90	85
Mississippi	27	30	30	32	100	85	80	87	2,700	2,550	2,400	2,784	70	70	80	75
Arkansas	38	44	40	41	77	80	70	57	2,926	3,520	2,800	2,337	85	85	90	95
Louisiana	1	1	1	1	135	110	80	89	135	110	80	89	70	75	75	70
Oklahoma	14	17	15	14	83	85	70	55	1,162	1,445	1,050	770	85	85	85	85
Texas	34	34	32	29	95	95	83	72	3,230	3,230	2,656	2,088	80	80	80	85
New Mexico	1	1	1	1	80	65	76	75	80	65	76	75	100	105	95	100
United States	387	366	349	346	89.2	82.7	77.8	75.7	34,538	30,268	27,152	26,181	84.2	85.0	91.7	92.2

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 164.—*Sugar cane sirup: Acreage, production, and December 1 price, by States, 1926–1929*

State	Acreage used for sirup				Average yield per acre				Production				Price per gallon received by producers Dec. 1			
	1926	1927	1928	1929 [1]	1926	1927	1928	1929	1926	1927	1928	1929 [1]	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Gals.*	*Gals.*	*Gals.*	*Gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
South Carolina	5	7	6	6	140	140	125	150	700	980	750	900	90	90	90	90
Georgia	35	34	29	33	175	150	140	160	6,125	5,100	4,060	5,280	75	75	75	75
Florida	10	9	8	9	210	183	180	190	2,100	1,647	1,440	1,710	85	85	85	85
Alabama	20	18	16	17	165	135	117	125	3,300	2,430	1,872	2,125	90	95	95	90
Mississippi	14	17	18	22	205	215	200	230	2,870	3,655	3,600	5,060	95	95	90	85
Arkansas	3	2	2	2	135	100	120	105	405	200	240	210	105	110	110	110
Louisiana	34	15	20	24	133	309	334	303	4,516	4,787	6,679	7,117	60	55	55	55
Texas	11	12	11	11	196	170	160	96	2,156	2,040	1,760	1,056	95	110	110	105
United States	132	114	110	124	168.0	182.8	185.5	189.2	22,172	20,839	20,401	23,458	80.7	81.5	77.6	75.4

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 165.—*Maple sugar and sirup: Production in 10 important States, 1917–1929* [1]

Year	Trees tapped	Sugar made	Sirup made	Total product in terms of sugar [2]	Average total product per tree		Average price received by producers	
					As sugar [2]	As sirup [2]	Per pound of sugar	Per gallon of sirup
	Thousand	*1,000 pounds*	*1,000 gallons*	*1,000 pounds*	*Pounds*	*Gallons*	*Cents*	*Dollars*
1917	17,313	10,525	4,258	44,589	2.58	0.32		
1918	19,132	12,944	4,863	51,848	2.71	.34		
1919	18,799	9,787	3,804	40,219	2.14	.27		
1920	18,895	7,324	3,580	35,964	1.90	.24		
1921	15,114	4,730	2,386	23,818	1.58	.20		
1922	16,274	5,147	3,640	34,267	2.11	.26		
1923	15,291	4,685	3,605	33,525	2.19	.27		
1924	15,407	4,078	3,903	35,302	2.29	.29	.26	2.02
1925	15,313	3,236	3,089	27,946	1.82	.23	.27	2.10
1926	14,712	3,569	3,737	33,465	2.27	.28	.29	2.16
1927	14,603	3,133	3,671	32,501	2.23	.28	.29	2.09
1928	14,388	2,317	3,007	26,373	1.83	.23	.29	2.05
1929	14,130	1,706	2,595	22,469	1.59	.20	.30	2.07

Bureau of Agricultural Economics.

[1] The data from 1917–1923 include 11 States: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, New York, Pennsylvania, Ohio, Indiana, Michigan, and Wisconsin; data for 10 States, excluding Connecticut, are shown for 1924 and 1925; 9 States, excluding Indiana, for which data are shown from 1926–1929, produced about 97 per cent of the maple sugar and about 92 per cent of the maple sirup in the United States in 1919 as reported by the Bureau of the Census.

[2] 1 gallon of sirup taken as equivalent to 8 pounds of sugar.

TABLE 166.—*Maple sugar and surip: Production, by States, 1926–1929*

State	Trees tapped				Sugar made				Sirup made			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Thousand	*Thousand*	*Thousand*	*Thousand*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*	*1,000 gals.*
Maine	304	310	304	307	29	15	3	14	61	60	38	50
New Hampshire	790	822	806	766	233	289	274	231	198	164	137	177
Vermont	5,554	5,665	5,722	5,665	1,602	1,694	1,133	966	980	1,417	1,038	1,083
Massachusetts	272	277	280	288	128	132	134	50	86	75	67	46
New York	3,958	3,839	3,647	3,647	1,168	733	549	334	1,128	1,002	718	615
Pennsylvania	696	626	607	565	223	148	67	43	251	139	157	85
Ohio	1,700	1,666	1,583	1,425	68	31	58	15	578	488	480	246
Michigan	863	828	869	886	100	72	70	40	300	172	208	163
Wisconsin	575	570	570	581	18	19	29	13	155	154	164	130
Total 9 States [1]	14,712	14,603	14,388	14,130	3,569	3,133	2,317	1,706	3,737	3,671	3,007	2,595

Bureau of Agricultural Economics.

[1] These 9 States produced about 97 per cent of the maple sugar and about 92 per cent of the maple sirup made in the United States in 1919 as reported by the Bureau of the Census.

TABLE 167.—*Tobacco: Acreage, yield, production, price, and farm value, by types, 1928–29*

Class and type name	Type No.	Acreage		Yield per acre		Production		Average price per pound		Farm value	
		1928	1929	1928	1929	1928	1929	1928 [1]	1929 [2]	1928	1929
		Acres	*Acres*	*Pounds*	*Pounds*	*1,000 pounds*	*1,000 pounds*	*Cents*	*Cents*	*1,000 dollars*	*1,000 dollars*
United States, all types		1,894,100	2,016,400	725.7	741.3	1,374,547	1,540,891	20.2	19.0	277,506	285,583
Class 1, flue cured	11–14	1,140,200	1,134,700	649.7	672.5	740,807	763,131	17.7	18.2	136,975	138,493
Old belt	11	430,300	436,000	613.1	678.4	263,822	295,800	18.3	18.0	48,181	53,226
Virginia	11	138,300	126,000	531	650	73,438	81,900	17.1	18.0	12,579	14,734
North Carolina	11	292,000	310,000	652	690	190,384	213,900	18.7	18.0	35,602	38,492
Eastern North Carolina belt	12	378,000	394,800	707	635	267,424	250,700	20.6	19.1	55,089	47,863
South Carolina belt	13	203,000	187,200	600	653	121,888	122,292	13.6	16.4	16,545	20,078
North Carolina	13	55,000	54,200	720	725	39,600	39,300	15.4	17.3	6,094	6,799
South Carolina	13	148,000	133,000	556	624	82,288	82,992	12.7	16.0	10,451	13,279
Georgia-Florida belt	14	128,900	116,700	680	808	87,673	94,339	12.7	18.4	11,160	17,321
Georgia	14	121,000	108,600	685	812	82,867	88,184	12.8	18.4	10,583	16,208
Florida	14	7,900	8,100	608	760	4,806	6,155	12.0	18.1	577	1,113
Class 2, fire cured	21–24	183,800	213,000	719.1	811.5	132,179	172,857	14.0	12.9	18,447	22,318
Virginia	21	31,200	31,000	703	800	21,934	24,800	10.6	15.0	2,325	3,720
Clarksville and Hopkinsville	22	105,000	119,500	718	793	75,419	94,425	15.6	13.5	11,749	12,734
Kentucky	22	44,000	51,500	723	830	31,800	42,745	15.0	12.9	4,770	5,514
Tennessee	22	61,000	68,000	715	760	43,619	51,680	16.0	14.0	6,979	7,220
Paducah	23	39,600	52,300	728	862	28,826	45,064	12.7	10.8	3,653	4,879
Kentucky	23	34,000	45,300	732	865	24,900	39,184	12.7	10.8	3,162	4,232
Tennessee	23	5,600	7,000	701	840	3,926	5,880	12.5	11.0	491	647
Henderson	24	8,000	10,200	750	840	6,000	8,568	12.0	11.5	720	985
Class 3a, air cured, light	31–32	367,300	449,200	792.5	756.5	291,073	339,835	30.2	22.4	87,826	76,156
Burley	31	336,300	417,200	805	753	270,613	314,235	30.4	22.3	82,240	70,140
Ohio	31	13,200	20,100	855	822	11,289	16,535	30.5	20.0	3,440	3,307
Indiana	31	11,200	16,800	820	765	9,184	12,852	26.8	21.1	2,462	2,710

Missouri	31	4,000	4,500	1,100	900	4,400	4,050	28.6	25.0	1,253	1,012
Virginia	31	4,100	6,300	1,100	1,048	4,510	6,602	30.4	25.0	1,371	1,650
West Virginia	31	6,800	8,500	750	775	5,100	6,588	26.8	25.0	1,367	1,647
North Carolina	31	3,000	5,000	667	832	2,000	4,160	30.0	20.0	600	832
Kentucky	31	255,000	306,000	800	725	204,100	221,848	30.6	22.3	62,456	49,438
Tennessee	31	39,000	50,000	770	832	30,030	41,600	30.9	23.0	9,286	9,544
Southern Maryland	32	31,000	32,000	660	800	20,460	25,600	27.3	23.5	5,586	6,016
Class 3b, air cured, dark	35-37	60,500	74,500	726.7	817.6	43,968	60,910	11.7	11.4	5,145	6,928
One-sucker	35	26,300	33,400	764	821	20,086	27,512	12.2	10.6	2,450	2,920
Indiana	35	2,300	3,500	820	825	1,886	2,888	11.0	10.0	207	289
Kentucky	35	20,000	25,600	750	825	15,000	21,120	12.5	10.8	1,875	2,281
Tennessee	35	4,000	4,300	800	815	3,200	3,504	11.5	10.0	368	350
Green River	36	27,000	34,400	700	825	18,900	28,380	11.6	12.0	2,192	3,406
Virginia, sun cured	37	7,200	6,700	692	749	4,982	5,018	10.1	12.0	503	602
Class 4, cigar filler	41-45	64,450	70,650	1,094.1	1,009.7	70,513	71,333	15.1	17.5	10,630	12,487
Pennsylvania seed leaf	41	36,350	38,150	1,341	1,233	48,740	47,051	13.9	17.9	6,779	8,417
Ohio and Indiana (Miami Valley) [3]	42-44	26,500	30,800	757	724	20,073	22,307	17.5	16.5	3,511	3,675
Georgia and Florida sun-grown	45	1,600	1,700	1,062	1,162	1,700	1,975	20.0	20.0	340	395
Class 5, cigar binder	51-55	63,600	59,350	1,301.8	1,291.7	82,796	76,663	17.7	22.3	14,696	17,093
Connecticut Valley broadleaf	51	10,800	7,400	1,311	1,404	14,162	10,390	21.0	30.2	2,974	3,140
Connecticut Valley Havana seed	52	13,350	12,100	1,309	1,486	17,474	17,983	24.0	34.5	4,196	6,205
New York and Pennsylvania Havana seed	53	1,450	1,350	1,283	1,000	1,860	1,350	19.3	19.0	359	256
Southern Wisconsin	54	22,200	22,600	1,353	1,234	30,044	27,860	13.7	14.8	4,116	4,112
Northern Wisconsin and Minnesota	55	15,800	15,900	1,219	1,200	19,256	19,080	15.8	17.7	3,051	3,380
Class 6, cigar wrapper	61-65	12,250	12,800	963.8	1,142.1	11,806	14,619	80.0	81.2	9,445	11,864
Connecticut Valley shade-grown	61	8,000	8,700	867	1,115	6,936	9,703	99.9	95.0	6,932	9,218
Georgia-Florida shade-grown	62	3,800	3,900	1,113	1,186	4,230	4,626	54.9	55.0	2,321	2,544
Connecticut Valley primed Havana seed	65	450	200	1,422	1,450	640	290	30.0	35.2	192	102
Class 7, miscellaneous	70	2,000	2,200	702.5	701.4	1,405	1,543	24.3	15.8	342	244
Louisiana Perique	70	1,000	1,000	405	378	405	378	45.0	40.0	182	151
Eastern Ohio	70	1,000	1,200	1,000	971	1,000	1,165	16.0	8.0	160	93

Bureau of Agricultural Economics. Estimates of the crop-reporting board.
NOTE.—1929 figures subject to revision on basis of later information.

[1] Revised.
[2] Estimated seasonal average price based on sales to Dec. 1.
[3] Gebhardt, Zimmer, and Dutch combined.

TABLE 168.—*Tobacco, unmanufactured: Acreage, production, value, exports, etc.; United States, 1890–1929*

Year	Acreage	Average yield per acre	Production	Price per pound received by producers Dec. 1	Farm value, Dec. 1	Domestic exports, year beginning July 1 [1]	Imports, year beginning July 1 [1]	Net exports, year beginning July 1 [1] [2]
	Acres	*Lbs.*	*1,000 lbs.*	*Cts.*	*1,000 dolls.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1890	722, 028	722. 8	518, 683	8. 3	42, 846	249, 233	23, 255	227, 254
1891	738, 216	747. 4	551, 777	8. 5	47, 074	255, 432	21, 989	234, 587
1892	720, 189	687. 6	495, 209	9. 3	46, 044	266, 083	28, 110	239, 153
1893	702, 952	687. 1	483, 024	8. 1	39, 155	290, 685	19, 663	272, 983
1894	523, 103	777. 4	406, 678	6. 8	27, 761	300, 992	26, 668	276, 223
1895	633, 950	775. 4	491, 544	7. 2	35, 574	295, 539	32, 925	266, 317
1896	594, 749	677. 6	403, 004	6. 0	24, 258	314, 932	13, 805	302, 847
1897	[3] 945, 604	646. 0	610, 860			263, 020	10, 477	254, 907
1898	[3] 933, 868	748. 0	698, 533			283, 613	14, 036	271, 559
1899	*1, 101, 460*	*788. 1*	*868, 113*					
1899	1, 101, 500	728. 5	802, 397	7. 1	57, 273	344, 656	19, 620	326, 939
1900	1, 046, 427	778. 2	814, 345	6. 6	53, 661	315, 788	26, 851	290, 915
1901	1, 039, 199	788. 0	818, 953	7. 1	58, 283	301, 007	29, 429	273, 770
1902	1, 030, 734	797. 3	821, 824	7. 0	57, 564	368, 184	34, 017	337, 902
1903	1, 037, 735	786. 3	815, 972	6. 8	55, 515	311, 972	31, 163	286, 335
1904	806, 409	819. 0	660, 461	8. 1	53, 383	334, 302	33, 288	304, 694
1905	776, 112	815. 6	633, 034	8. 5	53, 519	312, 227	41, 126	273, 912
1906	796, 099	857. 2	682, 429	10. 0	68, 233	340, 743	40, 899	302, 506
1907	820, 800	850. 5	698, 126	10. 2	71, 411	330, 813	35, 005	297, 657
1908	875, 425	820. 2	718, 061	10. 3	74, 130	287, 901	43, 123	247, 155
1909	*1, 294, 911*	*815. 3*	*1, 055, 765*					
1909	1, 294, 900	814. 8	1, 055, 133	10. 1	106, 374	357, 196	46, 838	313, 085
1910	1, 366, 100	807. 7	1, 103, 415	9. 3	102, 142	355, 327	48, 203	309, 171
1911	1, 013, 000	893. 7	905, 109	9. 4	85, 210	379, 845	54, 740	327, 199
1912	1, 226, 000	785. 5	962, 855	10. 8	104, 063	418, 797	67, 977	353, 575
1913	1, 216, 100	784. 3	953, 734	12. 8	122, 481	449, 750	61, 175	391, 196
1914	1, 223, 500	845. 7	1, 034, 679	9. 8	101, 411	348, 346	45, 809	306, 426
1915	1, 369, 900	775. 4	1, 062, 237	9. 1	96, 281	443, 293	48, 078	400, 624
1916	1, 413, 400	816. 0	1, 153, 278	14. 7	169, 672	411, 599	49, 105	370, 987
1917	1, 517, 800	823. 1	1, 249, 276	24. 0	300, 449	289, 171	86, 991	211, 962
1918	1, 647, 100	873. 7	1, 439, 071	28. 0	402, 264	629, 288	83, 951	577, 323
1919	*1, 864, 080*	*736. 6*	*1, 372, 993*					
1919	1, 951, 000	751. 1	1, 465, 481	39. 0	570, 868	648, 038	94, 005	570, 858
1920	1, 960, 000	807. 3	1, 582, 225	21. 2	335, 675	506, 526	58, 923	456, 477
1921	1, 427, 000	749. 6	1, 069, 693	19. 9	212, 728	463, 389	65, 225	403, 492
1922	1, 695, 000	735. 6	1, 246, 837	23. 2	289, 248	454, 364	73, 796	386, 213
1923	1, 877, 000	807. 2	1, 515, 110	19. 9	301, 096	597, 630	52, 380	550, 404
1924	*1, 537, 843*	*719. 4*	*1, 106, 340*					
1924	1, 705, 800	733. 6	1, 251, 343	20. 7	259, 139	430, 702	75, 131	357, 478
1925	1, 757, 300	783. 3	1, 376, 628	18. 2	250, 774	537, 240	68, 281	470, 651
1926	1, 656, 400	783. 6	1, 297, 889	18. 2	236, 702	516, 402	91, 089	426, 545
1927	1, 584, 900	764. 7	1, 211, 909	21. 2	256, 882	489, 996	79, 112	413, 299
1928	1, 894, 100	725. 7	1, 374, 547	[4] 20. 2	277, 506	565, 987	76, 891	491, 604
1929 [5]	2, 016, 400	744. 3	1, 500, 891	[4] 19. 0	285, 583			

Bureau of Agricultural Economics. Italic figures are census returns, other acreage, yield, and production figures are estimates of the crop-reporting board. See p. 970, 1927 Yearbook, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States; June issues 1919–1926, January and June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce.

[2] Total exports (domestic exports plus foreign) minus reexports.

[3] Revised on basis of 1899.

[4] Season average price.

[5] Preliminary.

TABLE 169.—*Tobacco: Acreage and production, by States, average 1923–1927 annual 1927–1929*

State	Acreage				Production			
	Average 1923–1927	1927	1928	1929 [1]	Average 1923–1927	1927	1928	1929 [1]
	Acres	*Acres*	*Acres*	*Acres*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Massachusetts	8, 040	7, 100	7, 600	7, 400	10, 707	8, 683	9, 462	10, 730
Connecticut	26, 600	23, 700	25, 000	21, 000	35, 612	28, 985	29, 750	27, 636
New York	1, 600	800	800	800	1, 816	960	1, 020	800
Pennsylvania	39, 800	34, 000	37, 000	38, 700	52, 730	46, 240	49, 580	47, 601
Ohio	46, 280	30, 100	40, 500	51, 800	39, 289	24, 652	32, 198	39, 782
Indiana	17, 420	8, 400	13, 700	20, 600	15, 240	6, 384	11, 234	15, 965
Wisconsin	34, 800	31, 000	37, 000	37, 000	38, 866	33, 170	48, 100	45, 140
Minnesota	----------	----------	1, 000	1, 500	----------	----------	1, 200	1, 800
Missouri	5, 000	4, 000	4, 000	4, 500	4, 817	4, 400	4, 400	4, 050
Maryland	30, 400	32, 000	31, 000	32, 000	24, 554	26, 176	20, 460	25, 600
Virginia	196, 000	177, 000	180, 800	170, 000	136, 373	127, 971	104, 864	118, 320
West Virginia	8, 100	4, 500	6, 800	8, 500	6, 581	3, 488	5, 488	6, 588
North Carolina	570, 600	659, 000	728, 000	764, 000	389, 715	485, 683	499, 408	508, 060
South Carolina	96, 200	104, 000	148, 000	133, 000	64, 904	76, 648	82, 288	82, 992
Georgia	51, 480	81, 500	122, 300	110, 000	37, 922	59, 088	84, 387	89, 870
Florida	6, 360	8, 800	12, 000	12, 300	5, 730	8, 228	9, 216	11, 070
Kentucky	451, 640	290, 200	388, 000	473, 000	369, 695	202, 269	300, 700	361, 845
Tennessee	124, 960	87, 800	109, 600	129, 300	95, 591	68, 484	80, 775	102, 664
Louisiana	1, 000	1, 000	1, 000	1, 000	434	400	405	378
United States	1, 716, 280	1, 584, 900	1, 894, 100	2, 016, 400	1, 330, 576	1, 211, 909	1, 374, 547	1, 500, 891

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 170.—*Tobacco: Yield per acre and estimated price per pound, December 1, by States, averages and annual 1924–1929*

State	Yield per acre							Estimated price per pound						
	Av. 1918–1927	1924	1925	1926	1927	1928	1929	Av. 1923–1927	1924	1925	1926	1927	1928 [1]	1929 [1]
	Lbs.	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Massachusetts	1, 369	1, 340	1, 243	1, 448	1, 223	1, 245	1, 450	31. 5	26. 8	16. 0	35. 0	35. 7	34. 1	44. 4
Connecticut	1, 372	1, 370	1, 352	1, 340	1, 223	1, 190	1, 316	31. 0	32. 3	19. 0	35. 6	36. 6	37. 2	50. 3
New York	1, 188	1, 175	1, 100	1, 100	1, 200	1, 275	1, 000	20. 3	22. 3	22. 0	19. 0	18. 0	19. 3	19. 0
Pennsylvania	1, 367	1, 250	1, 400	1, 320	1, 360	1, 340	1, 230	14. 5	15. 7	15. 0	10. 5	13. 0	14. 0	17. 9
Ohio	887	705	974	846	819	795	768	15. 5	19. 4	15. 0	10. 1	18. 4	22. 0	17. 7
Indiana	871	893	871	884	760	820	775	16. 1	16. 6	18. 0	9. 7	22. 0	24. 0	19. 0
Wisconsin	1, 190	940	1, 375	1, 150	1, 070	1, 300	1, 220	14. 1	13. 0	16. 5	13. 8	16. 0	14. 6	16. 0
Minnesota	----	----	----	----	----	1, 200	1, 200	----	----	----	----	----	12. 0	15. 0
Missouri	954	852	815	950	1, 100	1, 100	900	23. 4	25. 0	27. 0	15. 0	22. 0	28. 6	25. 0
Maryland	790	765	823	840	818	660	800	24. 1	26. 9	19. 0	23. 7	23. 0	27. 3	23. 5
Virginia	682	650	647	725	723	580	696	18. 4	21. 4	15. 6	17. 6	17. 8	16. 0	17. 5
West Virginia	783	775	775	850	775	750	775	19. 8	21. 4	18. 2	13. 1	24. 5	26. 8	25. 0
North Carolina	647	577	695	684	737	686	665	24. 1	25. 8	23. 0	26. 4	22. 0	19. 5	18. 5
South Carolina	672	485	740	668	737	556	624	19. 4	17. 0	17. 0	23. 3	20. 5	12. 7	16. 0
Georgia	669	777	720	770	725	690	817	23. 2	26. 6	15. 0	24. 0	19. 4	13. 2	18. 7
Florida	952	750	832	968	935	768	900	38. 4	37. 6	31. 0	37. 8	34. 8	29. 1	31. 2
Kentucky	835	836	810	842	697	775	765	16. 3	17. 1	16. 0	10. 6	21. 4	25. 0	18. 2
Tennessee	765	795	726	781	780	737	794	16. 4	18. 6	17. 0	10. 5	21. 4	21. 2	17. 3
Louisiana	442	400	504	400	400	405	378	50. 0	55. 0	55. 0	45. 0	45. 0	45. 0	40. 0
United States	779. 0	733. 6	783. 3	783. 6	764. 7	725. 7	744. 3	19. 6	20. 7	18. 2	18. 2	21. 2	20. 2	19. 0

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Season average price.

TABLE 171.—*Tobacco: Acreage, yield per acre, and production in specified countries, annual 1927–1929*

Country	Acreage			Yield per acre			Production		
	1927	1928	1929 (Preliminary)	1927	1928	1929 (Preliminary)	1927	1928	1929 (Preliminary)
North America, Central America and West Indies:	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Canada	44	43	38	998	976	784	43, 910	41, 976	29, 786
United States	1, 585	1, 894	2, 016	765	726	744	1, 211, 909	1, 374, 547	1, 500, 891
Mexico	41	42		541	615		22, 165	25, 829	
Cuba							57, 360	[1] 60, 000	
Dominican Republic [2]							40, 000	30, 000	45, 000
Porto Rico	83	40	39	569	533	631	47, 250	21, 326	24, 600
Europe:									
Sweden	1			1, 231			1, 231		
Belgium	8	8	7	2, 004	1, 940	1, 767	16, 035	15, 522	12, 372
France	39	38		1, 625	1, 317		63, 380	50, 062	
Italy	92	95	96	719	846	1, 011	66, 173	80, 408	97, 034
Germany	23	25	24	1, 914	2, 078		44, 013	51, 948	
Czechoslovakia	13	15	16	1, 293	1, 000	1, 116	16, 804	15, 007	17, 858
Hungary	58	56		1, 191	1, 035		69, 095	57, 982	
Yugoslavia	27	28	38	543	462	684	14, 671	12, 944	26, 000
Greece	228	230	[1] 278	611	563	629	139, 367	129, 493	[1] 175, 000
Bulgaria	60	53	84	797	435	655	47, 829	23, 041	55, 050
Rumania	76	68	76	585	501		44, 430	34, 080	
Poland	7	9		1, 507	1, 590		10, 550	14, 308	
Russia	222	207		1, 663	1, 410		369, 204	291, 955	
North Africa:									
Algeria	72	65		814	848		58, 583	55, 128	
Tunis	1	2	2	1, 197	782	772	1, 197	1, 564	1, 543
French West Africa	51			250			12, 743		
Asia:									
Turkey	194	150		765	633		148, 384	95, 000	99, 000
Persia [1]							26, 500	26, 000	
Palestine	2	2		603	355		1, 206	710	
Syria	7	6	9	520	467	666	3, 638	2, 804	5, 997
India	1, 208	1, 275			1, 058			1, 348, 480	
Ceylon	13	13		692	692		9, 000	9, 000	
Indo-China [3]	14	12		409	664		5, 732	7, 967	
Japan	91	92	88	1, 652	1, 600	1, 569	150, 323	147, 159	138, 065
Chosen (Korea)	41	49		882	939		36, 147	45, 988	
Taiwan (Formosa)	2	2		1, 368	1, 655		2, 735	3, 310	
Siam	22	23		440	424		9, 686	9, 763	
Philippine Islands	207	200		535	509		110, 707	101, 801	
South America:									
Columbia	32			688			22, 000		
Brazil	185			811			150, 000		
Paraguay							19, 727		
Chile	6			1, 803			10, 819		
Argentina	23			1, 316			30, 268		
South Africa:									
French Equatorial Africa	16			62			991		
Union of South Africa	40			578			23, 102	14, 500	
Southern Rhodesia [4]	47	18		531	422		24, 943	7, 600	
Northern Rhodesia [4]	7			466			3, 262		
Nyasaland							14, 520		
Madagascar	13			1, 102			14, 330		
Oceania:									
Dutch East Indies, Java and Madura [5]	67	77		844	902		56, 516	69, 447	
Sumatra [6]	49	63		842	743		41, 270	46, 789	
Australia [7]	1			794			794		
Total all countries reporting acreage or production, all years	2, 338	2, 599	2, 811				1, 947, 490	1, 990, 791	2, 228, 196
Estimated world total exclusive of India and China [8]							3, 670, 000		

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Figures refer to the crop harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere except in the Dutch East Indies, where the harvest is largely completed within the calendar year.

[1] Unofficial estimate.

[2] Unofficial estimate of the export crop.

[3] Annam and Cochin-China only. In addition in 1927: Cambodia, 7,544,141 pounds and 8,000 acres; Tonking, 4,542 acres; Laos, 1,228,000 pounds. In 1928: Tonking, 3,400 acres; Laos, 414,000 pounds.

[4] European cultivation only.

[5] Estate production only. Figures for native production not available. Total production of the islands is roughly estimated, on the basis of average yield of 311 pounds per acre for the native area, with the addition of the estate production, at 185,000,000 pounds in 1927 and 205,000,000 pounds in 1928.

[6] Estate production only.

[7] Exclusive of Victoria with an area of 1,176 acres.

[8] No data are available for the total production for India prior to 1928 or for China. Both are of considerable importance.

TABLE 172.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1929*

FLUE-CURED, TYPES 11-14

Year	Production [1]	Stocks on hand July 1	Total supply	Disappearance, year beginning July 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1913	282.8	[2] 211.0	493.8	262.3	18.3
1914	275.4	[2] 231.5	506.9	238.3	11.3
1915	312.0	[2] 268.6	580.6	301.2	10.5
1916	263.3	[2] 279.4	542.7	289.3	19.0
1917	358.8	253.4	612.2	319.8	30.5
1918	487.1	292.4	779.5	452.2	34.3
1919	487.5	327.3	814.8	510.6	44.6
1920	630.8	304.2	935.0	451.9	21.1
1921	371.4	483.1	854.5	413.8	21.7
1922	408.8	440.7	849.5	410.8	29.0
1923	592.9	438.7	1,031.6	555.0	22.3
1924	436.8	476.6	913.4	451.1	22.5
1925	576.3	462.3	1,038.6	583.2	20.0
1926	564.5	455.4	1,019.9	553.4	25.6
1927	715.9	466.5	1,182.4	617.4	21.3
1928	740.8	565.0	1,305.8	715.8	17.7
1929	[3] 763.1	590.0	1,353.1		[3] 18.2

VIRGINIA FIRE-CURED, TYPE 21

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	49.5	34.6	84.1	50.4	7.8
1913	58.4	33.7	92.1	57.9	7.0
1914	37.0	34.2	71.2	42.5	7.3
1915	54.6	28.7	83.3	44.5	8.0
1916	53.8	38.8	92.6	47.4	10.4
1917	51.5	45.2	96.7	54.9	17.0
1918	60.2	41.8	102.0	67.8	17.7
1919	36.6	34.2	70.8	40.0	25.0
1920	45.6	30.8	76.4	41.8	9.1
1921	24.6	34.6	59.2	34.5	18.8
1922	49.1	24.7	73.8	46.8	19.8
1923	43.8	27.0	70.8	36.6	18.1
1924	43.1	34.2	77.3	34.2	19.4
1925	42.0	43.1	85.1	35.2	16.2
1926	43.8	49.9	93.7	37.6	7.8
1927	26.6	56.1	82.7	33.7	9.9
1928	21.9	49.0	70.9	39.6	10.6
1929	[3] 24.8	31.3	56.1		[3] 15.0

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.
[2] Estimated.
[3] Estimated December, 1929.

TABLE 172.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1929*—Continued

KENTUCKY AND TENNESSEE FIRE-CURED, TYPES 22 AND 23

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound	
					Clarksville and Hopkinsville	Paducah
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*	*Cents*
1912	141.2	91.1	232.3	120.7	7.8	6.2
1913	139.0	111.6	250.6	108.8	9.0	7.7
1914	133.7	141.8	275.5	125.7	7.5	6.1
1915	157.0	149.8	306.8	184.4	6.5	6.0
1916	176.8	122.4	299.2	171.2	10.8	9.8
1917	190.4	128.0	318.4	121.3	14.8	14.0
1918	153.0	197.1	350.1	208.1	22.6	21.0
1919	233.7	142.0	375.7	196.4	19.8	15.4
1920	180.5	179.3	359.8	204.1	11.6	9.5
1921	132.9	155.7	288.6	158.4	16.7	13.0
1922	181.9	130.2	312.1	171.2	15.9	13.2
1923	199.0	140.9	339.9	196.5	12.2	10.9
1924	156.3	143.4	299.7	148.5	15.5	9.8
1925	154.4	151.2	305.6	136.4	10.1	6.9
1926	129.2	169.2	298.4	136.5	8.4	6.0
1927	81.0	161.9	242.9	128.8	18.5	12.2
1928	104.2	114.1	218.3	114.2	15.6	12.7
1929	[3] 139.5	104.1	243.6	----------	[3] 13.5	[3] 10.8

HENDERSON FIRE-CURED (HENDERSON STEMMING) TYPE 24

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1923	14.6	3.0	17.6	13.8	12.8
1924	14.2	3.8	18.0	12.2	12.0
1925	14.0	5.8	19.8	12.4	7.3
1926	9.9	7.4	17.3	10.1	7.4
1927	4.2	7.2	11.4	6.8	9.7
1928	6.0	4.6	10.6	9.9	12.0
1929	[3] 8.6	.7	9.3	----------	[3] 11.5

BURLEY, TYPE 31

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
1912	196.1	215.3	411.4	186.2	11.0
1913	176.8	225.2	402.0	198.3	12.3
1914	224.7	203.7	428.4	178.6	8.1
1915	217.3	249.8	467.1	267.8	9.5
1916	257.0	199.3	456.3	248.7	15.5
1917	251.5	207.6	459.1	269.0	26.5
1918	312.0	190.1	502.1	272.2	32.6
1919	277.6	229.9	507.5	239.7	33.2
1920	315.3	267.8	583.1	258.7	13.4
1921	220.8	324.4	545.2	264.3	22.4
1922	275.6	280.9	556.5	213.6	25.2
1923	329.5	342.9	672.4	244.1	21.4
1924	299.2	428.3	727.5	268.4	21.3
1925	275.1	459.1	734.2	268.2	19.0
1926	301.0	466.0	767.0	315.7	13.1
1927	180.2	451.3	631.5	283.7	26.0
1928	270.6	347.8	618.4	286.0	30.4
1929	[3] 314.2	332.4	646.6	----------	[3] 22.3

[1] Green weight basis, i. e., farmers sales weight. Disappearance includes consumption, exports, and losses.
[3] Estimated December, 1929.

TABLE 172.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1929*—Continued

SOUTHERN MARYLAND, [4] TYPE 32

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	22.0	9.4	31.4	23.9	8.1
1913	21.0	7.5	28.5	18.9	9.1
1914	20.4	9.6	30.0	8.2	8.0
1915	18.2	21.8	40.0	27.5	8.5
1916	23.4	12.5	35.9	15.7	15.6
1917	25.9	20.2	46.1	21.7	20.0
1918	32.7	24.4	57.1	28.9	30.0
1919	26.0	28.2	54.2	26.6	24.4
1920	36.9	27.6	64.5	35.7	18.6
1921	20.3	28.8	49.1	25.6	19.0
1922	22.2	23.5	45.7	30.1	17.4
1923	22.1	15.6	37.7	20.4	27.5
1924	22.8	17.3	40.1	21.9	26.7
1925	25.1	18.2	43.3	22.8	23.6
1926	26.6	20.5	47.1	24.3	23.5
1927	27.0	22.8	49.8	23.7	22.8
1928	21.5	26.1	47.6	27.0	26.8
1929	[3] 26.8	20.6	47.4		[3] 22.8

ONE SUCKER, TYPE 35

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
1912	42.8	22.6	65.4	33.5	6.5
1913	28.2	31.9	60.1	32.3	7.1
1914	36.9	27.8	64.7	42.4	5.6
1915	30.0	22.3	52.3	35.6	5.5
1916	41.8	16.7	58.5	39.9	10.0
1917	45.0	18.6	63.6	27.7	17.0
1918	45.0	35.9	80.9	48.4	14.4
1919	69.8	32.5	102.3	57.7	13.4
1920	53.7	44.6	98.3	50.7	7.0
1921	27.6	47.6	75.2	38.8	12.0
1922	50.4	36.4	86.8	53.0	12.2
1923	54.1	33.8	87.9	46.1	10.1
1924	39.1	41.8	80.9	38.5	11.2
1925	35.5	42.4	77.9	28.0	8.3
1926	30.8	49.9	80.7	39.0	5.7
1927	13.1	41.7	54.8	27.9	10.6
1928	20.1	26.9	47.0	25.6	12.2
1929	[3] 27.5	21.4	48.9		[3] 10.6

GREEN RIVER, TYPE 36

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
1923	58.9	52.2	111.1	56.4	11.0
1924	47.6	54.7	102.3	50.3	11.6
1925	51.0	52.0	103.0	51.3	6.9
1926	40.0	51.7	91.7	43.3	7.4
1927	18.1	48.4	66.5	26.4	9.1
1928	18.9	40.1	59.0	28.2	11.6
1929	[3] 28.4	30.8	59.2		[3] 12.0

VIRGINIA SUN-CURED, TYPE 37

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
1912	9.8	11.2	21.0	10.7	8.0
1913	12.7	10.3	23.0	9.8	8.5
1914	9.1	13.2	22.3	12.8	6.5
1915	10.2	9.5	19.7	12.4	8.0
1916	8.3	7.3	15.6	10.7	14.0
1917	8.8	4.9	13.7	7.4	28.5
1918	11.9	6.3	18.2	9.6	20.5
1919	6.5	8.6	15.1	5.4	28.0
1920	9.0	9.7	18.7	9.2	9.2
1921	4.0	9.5	13.5	5.2	18.2
1922	8.2	8.3	16.5	8.2	14.3
1923	5.6	8.3	13.9	7.6	13.2
1924	5.6	6.3	11.9	7.7	14.6
1925	5.7	4.2	9.9	5.7	16.4
1926	7.2	4.2	11.4	5.5	9.4
1927	5.5	5.9	11.4	6.3	13.1
1928	5.0	5.1	10.1	4.6	10.1
1929	[3] 5.0	5.5	10.5		[3] 12.0

[1] Green weight basis, i. e., farmers sales weight. Disappearance includes consumption, exports, and losses.
[3] Estimated December, 1929.
[4] Includes Eastern Ohio.

TABLE 172.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1929*—Continued

PENNSYLVANIA CIGAR LEAF, TYPES 41 AND 53[5]

Year	Production[1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1[1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	64.1	118.8	182.9	55.6	8.5
1913	46.7	127.3	174.0	61.0	7.5
1914	48.0	113.0	161.0	55.5	7.5
1915	42.4	105.5	147.9	68.6	9.2
1916	49.1	79.3	128.4	51.9	14.2
1917	58.1	76.5	134.6	49.5	21.0
1918	64.8	85.1	149.9	58.2	14.0
1919	56.8	91.7	148.5	60.7	18.0
1920	64.9	87.8	152.7	69.6	12.0
1921	61.3	83.1	144.4	54.1	14.4
1922	56.8	90.3	147.1	48.0	16.0
1923	59.0	99.1	158.1	48.4	18.1
1924	57.5	109.7	167.2	53.8	15.7
1925	57.4	113.4	170.8	65.5	10.4
1926	43.6	105.3	148.9	64.8	10.5
1927	46.2	84.1	130.3	45.7	13.0
1928	49.6	84.6	134.2	49.9	14.0
1929	[3] 47.6	84.3	131.9		[3] 17.9

OHIO CIGAR LEAF (MIAMI VALLEY), TYPES 42–44

Year	Production[1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1[1]	Average price per pound
1912	53.5	89.6	143.1	59.0	8.0
1913	37.4	84.1	121.5	53.0	11.0
1914	54.1	68.5	122.6	48.3	9.1
1915	54.3	74.3	128.6	68.7	9.0
1916	58.2	59.9	118.1	53.7	12.0
1917	61.7	64.4	126.1	59.4	24.0
1918	53.0	66.7	119.7	50.4	16.0
1919	41.4	69.3	110.7	30.9	20.0
1920	37.3	79.8	117.1	38.8	16.0
1921	28.8	78.3	107.1	33.1	13.0
1922	26.7	74.0	100.7	26.6	13.9
1923	25.9	74.1	100.0	26.3	13.0
1924	25.4	73.7	99.1	42.7	13.0
1925	39.1	56.4	95.5	23.8	11.4
1926	23.3	71.7	95.0	38.2	8.5
1927	16.6	56.8	73.4	26.5	15.6
1928	20.1	46.9	67.0	27.1	17.5
1929	[3] 22.3	39.9	62.2		[3] 16.5

NEW ENGLAND BROADLEAF, TYPE 51

Year	Production[1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1[1]	Average price per pound
1922	14.4	31.8	46.2	12.5	30.0
1923	20.2	33.7	53.9	14.1	29.0
1924	22.8	39.8	62.6	17.9	20.0
1925	25.3	44.7	70.0	26.2	18.9
1926	17.5	43.8	61.3	23.6	25.0
1927	15.0	37.7	52.7	21.3	21.0
1928	14.2	31.4	45.6	14.6	21.0
1929	[3] 10.4	31.0	41.4		[3] 30.2

NEW ENGLAND HAVANA SEED, TYPES 52 AND 65

Year	Production[1]		Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1[1]	Average price per pound	
	Primed Havana seed	Havana seed				Primed Havana seed	Havana seed
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*	*Cents*
1922	1.4	16.4	34.8	52.6	12.6	30.0	29.3
1923	1.1	22.1	40.0	63.2	18.4	26.0	26.0
1924	1.0	20.4	44.8	66.2	17.3	23.0	19.0
1925	.5	20.1	48.9	69.5	21.0	21.0	16.1
1926	.5	15.5	48.5	64.5	22.1	35.0	26.0
1927	.7	15.6	42.4	58.7	21.8	30.0	23.4
1928	.6	17.5	36.9	55.0	23.6	30.0	24.0
1929	[3] .3	[3] 18.0	31.4	49.7		[3] 35.2	[3] 34.5

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.
[3] Estimated December, 1929.
[5] Does not include New York Havana seed.

TABLE 172.—*Tobacco: Production, stocks, supply, disappearance, and price, 1912–1929*—Continued

WISCONSIN CIGAR LEAF, TYPES 54 AND 55

Year	Production [1]	Stocks on hand Oct. 1	Total supply	Disappearance, year beginning Oct. 1 [1]	Average price per pound
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Cents*
1912	54.4	71.2	125.6	53.5	11.0
1913	50.7	72.1	122.8	51.5	12.0
1914	53.8	71.3	125.1	46.2	7.5
1915	36.9	78.9	115.8	56.0	6.0
1916	55.8	59.8	115.6	62.5	12.5
1917	44.5	53.1	97.6	46.8	17.5
1918	65.2	50.8	116.0	47.3	22.0
1919	61.0	68.7	129.7	44.4	23.5
1920	62.4	85.3	147.7	54.2	13.9
1921	61.5	93.5	155.0	34.4	12.5
1922	45.6	120.6	166.2	49.0	13.5
1923	48.1	117.2	165.3	55.3	12.0
1924	35.7	110.0	145.7	47.5	9.0
1925	44.0	98.2	142.2	49.0	13.8
1926	33.4	93.2	126.6	43.5	13.8
1927	33.2	83.1	116.3	43.8	16.0
1928	49.3	72.5	121.8	35.1	14.5
1929	[3] 46.9	86.7	133.6	----------	[3] 16.0

Bureau of Agricultural Economics; stocks prior to 1929 compiled from reports of the Bureau of the Census.

[1] Green weight basis, i. e., farmers' sales weight. Disappearance includes consumption, exports, and losses.

[3] Estimated December, 1929.

TABLE 173.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1929*

FLUE CURED TYPES 11, 12, 13, 14

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912	----------	----------	----------	237,189	1921	523,913	571,148	483,109	482,740
1913	----------	254,160	----------	227,987	1922	570,154	516,494	440,697	446,257
1914	----------	282,341	----------	238,372	1923	544,405	490,426	438,667	463,077
1915	----------	335,725	----------	276,772	1924	619,840	582,562	476,626	510,020
1916	----------	358,238	----------	268,130	1925	579,462	543,605	462,311	513,171
1917	332,460	297,701	253,436	349,936	1926	603,090	548,476	455,371	492,984
1918	428,914	397,511	292,357	341,500	1927	628,574	556,787	466,476	580,670
1919	427,370	434,517	327,277	367,977	1928	756,535	678,958	564,989	661,817
1920	448,542	415,332	304,206	229,763	1929	766,370	703,396	589,978	----------

VIRGINIA FIRE CURED, TYPE 21

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	----------	----------	----------	34,593	1921	32,493	50,180	41,679	34,615
1913	----------	53,857	----------	33,730	1922	36,527	39,182	31,429	24,671
1914	----------	54,646	----------	34,248	1923	23,258	44,806	34,523	26,971
1915	----------	51,244	----------	28,656	1924	32,677	41,529	37,828	34,155
1916	----------	57,562	----------	38,756	1925	38,453	55,933	49,468	43,069
1917	46,348	55,627	48,365	45,236	1926	52,242	64,136	57,707	49,924
1918	45,123	56,571	43,431	41,810	1927	53,065	73,510	65,052	56,146
1919	46,472	59,591	42,919	34,221	1928	57,000	64,931	59,409	49,040
1920	37,715	48,531	34,972	30,809	1929	47,633	49,092	----------	----------

KENTUCKY AND TENNESSEE FIRE CURED, TYPES 22 AND 23

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	----------	----------	----------	91,097	1921	138,166	178,847	190,673	155,731
1913	----------	142,932	----------	111,639	1922	132,999	202,046	179,115	130,159
1914	----------	170,831	----------	141,793	1923	100,148	168,571	185,349	140,869
1915	----------	158,725	----------	149,834	1924	113,753	160,122	190,312	143,446
1916	----------	148,133	----------	122,368	1925	118,557	197,605	192,687	151,189
1917	97,056	219,286	210,024	128,011	1926	141,311	183,733	194,054	169,250
1918	117,118	144,957	222,918	197,107	1927	132,340	198,465	186,791	161,939
1919	158,036	219,181	203,462	141,978	1928	150,328	168,012	143,983	114,120
1920	118,800	206,428	200,984	179,253	1929	105,902	140,420	133,719	----------

TABLE 173.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1929*—Continued

HENDERSON FIRE CURED (HENDERSON STEMMING), TYPE 24

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912	------	------	------	1,023	1921	9,815	13,479	11,376	7,930
1913	------	13,210	------	7,818	1922	8,175	13,695	7,370	3,892
1914	------	9,199	------	1,980	1923	5,340	13,236	8,567	3,020
1915	------	11,788	------	2,424	1924	4,083	11,627	5,961	3,812
1916	------	12,087	------	4,649	1925	5,138	13,595	8,472	5,837
1917	5,236	19,008	18,432	16,423	1926	7,639	13,785	10,660	7,361
1918	15,481	25,387	32,138	22,886	1927	6,145	11,190	9,987	7,242
1919	20,112	26,232	17,592	7,532	1928	7,694	8,390	5,314	4,583
1920	5,899	17,023	17,847	12,132	1929	3,446	2,859	1,288	------

BURLEY, TYPE 31

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	------	------	------	215,307	1921	237,777	399,002	371,662	324,351
1913	------	327,078	------	225,199	1922	293,606	395,027	341,425	280,856
1914	------	311,289	------	203,672	1923	282,731	463,014	404,989	342,885
1915	------	343,739	------	249,804	1924	334,126	542,409	482,201	428,332
1916	------	319,436	------	199,321	1925	405,643	562,769	498,045	459,087
1917	188,158	323,191	274,031	207,594	1926	462,805	578,298	524,215	466,037
1918	177,207	306,637	247,505	190,137	1927	469,811	586,337	518,363	451,251
1919	139,039	333,912	287,565	229,891	1928	438,267	475,508	411,095	347,827
1920	227,279	328,136	320,218	267,789	1929	354,772	465,941	396,541	------

SOUTHERN MARYLAND, TYPE 32

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	------	------	------	6,644	1921	16,549	14,487	12,435	19,405
1913	------	3,946	------	6,773	1922	14,127	12,528	11,371	16,944
1914	------	4,064	------	7,836	1923	10,673	6,080	5,019	12,575
1915	------	9,877	------	17,629	1924	6,842	4,780	7,741	15,232
1916	------	6,457	------	10,644	1925	11,457	9,072	8,758	16,678
1917	8,689	9,050	11,092	18,227	1926	14,983	9,876	8,203	19,349
1918	18,145	15,259	14,249	19,369	1927	18,699	12,447	12,523	21,899
1919	18,627	17,317	14,586	21,571	1928	15,314	10,848	12,104	25,132
1920	21,256	16,849	10,050	18,478	1929	20,245	13,134	13,293	------

ONE SUCKER, TYPE 35

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	------	------	------	22,586	1921	41,620	56,165	52,761	47,635
1913	------	36,983	------	31,866	1922	52,435	52,310	45,938	36,354
1914	------	44,193	------	27,842	1923	43,584	56,226	42,135	33,804
1915	------	37,294	------	22,260	1924	41,413	64,360	55,202	41,764
1916	------	29,690	------	16,702	1925	43,342	59,207	52,535	42,429
1917	30,139	44,117	30,527	18,562	1926	43,275	63,291	57,136	49,924
1918	29,101	47,317	49,373	35,901	1927	46,601	59,143	48,245	41,668
1919	34,318	73,834	45,835	32,520	1928	38,813	39,815	32,399	26,882
1920	41,834	64,318	46,984	44,589	1929	28,067	37,666	26,496	------

GREEN RIVER, TYPE 36

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	------	------	------	42,876	1921	46,318	58,795	50,213	45,015
1913	------	64,999	------	50,389	1922	50,525	54,479	45,806	39,110
1914	------	59,656	------	48,156	1923	45,099	70,227	64,041	52,243
1915	------	58,389	------	45,193	1924	55,742	67,571	62,121	54,676
1916	------	55,266	------	34,344	1925	56,169	70,726	57,139	51,955
1917	38,926	65,321	58,947	49,484	1926	52,681	61,867	57,908	51,711
1918	53,509	73,021	74,038	59,960	1927	54,161	63,115	54,683	48,447
1919	55,413	74,781	55,444	40,469	1928	47,878	49,127	43,722	40,127
1920	44,024	65,618	61,105	47,212	1929	41,122	35,968	35,670	------

VIRGINIA SUN CURED, TYPE 37

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912	------	------	------	11,157	1921	7,172	10,071	9,812	9,467
1913	------	13,098	------	10,252	1922	10,146	10,637	9,844	8,282
1914	------	12,725	------	13,205	1923	8,126	10,371	9,298	8,307
1915	------	13,655	------	9,465	1924	8,787	8,581	7,605	6,255
1916	------	11,758	------	7,286	1925	5,739	6,769	5,503	4,172
1917	8,907	9,169	7,158	4,863	1926	4,771	6,059	5,319	4,243
1918	5,712	7,427	7,939	6,320	1927	5,482	7,966	7,236	5,925
1919	8,091	10,480	10,097	8,592	1928	6,504	7,558	6,347	5,052
1920	9,258	9,238	8,320	9,679	1929	4,422	7,915	6,073	------

TABLE 173.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1929*—Continued

PENNSYLVANIA CIGAR LEAF, TYPES 41 AND 53

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912				118, 782	1921	69, 445	93, 919	93, 622	83, 072
1913		141, 015		127, 345	1922	69, 854	96, 827	101, 276	90, 258
1914		125, 606		113, 013	1923	81, 375	119, 621	110, 387	99, 080
1915		127, 239		105, 460	1924	87, 395	127, 273	120, 441	109, 726
1916		109, 392		79, 294	1925	97, 444	118, 585	122, 487	113, 400
1917	69, 536	90, 751	87, 922	76, 503	1926	97, 585	117, 839	118, 905	105, 261
1918	62, 970	99, 766	96, 753	85, 127	1927	89, 708	113, 551	95, 539	84, 067
1919	75, 764	94, 496	99, 954	91, 696	1928	71, 516	106, 646	95, 466	84, 649
1920	80, 439	105, 736	98, 671	87, 750	1929	72, 424	115, 639	93, 861	

OHIO CIGAR LEAF (MIAMI VALLEY), TYPES 42, 43, 44

1912				89, 575	1921	70, 173	78, 771	76, 225	78, 303
1913		90, 327		84, 081	1922	71, 414	75, 579	79, 182	73, 974
1914		82, 436		68, 521	1923	64, 026	85, 024	81, 719	74, 119
1915		91, 029		74, 329	1924	62, 531	60, 244	80, 193	73, 731
1916		74, 191		59, 913	1925	65, 612	63, 296	61, 024	56, 381
1917	50, 304	84, 505	74, 924	64, 379	1926	51, 650	67, 024	75, 003	71, 694
1918	52, 590	71, 822	75, 658	66, 713	1927	62, 490	72, 037	64, 386	56, 774
1919	61, 023	56, 282	62, 094	69, 305	1928	48, 420	60, 696	55, 515	46, 875
1920	71, 550	64, 602	79, 350	79, 763	1929	38, 868	55, 392	49, 686	

GEORGIA-FLORIDA CIGAR LEAF—SUN AND SHADE, TYPES 45 AND 62

1912				7, 677	1921	7, 944	6, 853	5, 544	8, 312
1913		6, 231		8, 352	1922	9, 499	7, 389	6, 697	8, 139
1914		6, 472		10, 549	1923	7, 586	6, 384	5, 199	7, 302
1915		6, 461		8, 515	1924	8, 415	7, 140	6, 149	6, 604
1916		6, 645		7, 697	1925	7, 206	5, 931	4, 759	5, 308
1917	6, 568	5, 459	4, 371	6, 358	1926	4, 364	4, 077	3, 431	4, 957
1918	5, 213	5, 367	4, 778	6, 741	1927	4, 088	3, 190	1, 876	4, 879
1919	7, 166	5, 818	4, 805	6, 010	1928	4, 461	4, 019	2, 618	7, 081
1920	6, 281	5, 914	4, 760	6, 569	1929	5, 994			

PORTO RICO CIGAR LEAF, TYPE 46

1912				2, 942	1921	9, 541	9, 116	7, 866	7, 698
1913		3, 814		4, 128	1922	9, 408	9, 499	8, 858	10, 873
1914		4, 384		4, 874	1923	11, 331	9, 446	6, 519	9, 546
1915		6, 935		5, 889	1924	11, 673	11, 116	8, 773	9, 221
1916		4, 684		4, 781	1925	10, 455	10, 130	8, 350	8, 074
1917	4, 567	3, 494	2, 480	4, 843	1926	11, 279	10, 194	7, 651	10, 719
1918	7, 308	7, 297	6, 432	7, 669	1927	18, 577	17, 639	13, 746	16, 588
1919	10, 023	9, 137	8, 119	11, 115	1928	21, 426	23, 646	21, 172	20, 067
1920	10, 833	8, 874	7, 419	8, 746	1929	22, 230			

NEW ENGLAND BROAD LEAF, TYPE 51

1912					1921	26, 726	31, 956	31, 720	29, 982
1913					1922	26, 142	27, 159	33, 560	31, 761
1914				31, 496	1923	30, 997	36, 840	38, 504	33, 690
1915		30, 538		31, 218	1924	30, 386	39, 737	45, 588	39, 827
1916		33, 689		29, 884	1925	36, 294	43, 978	49, 382	44, 712
1917	26, 277	28, 620	30, 253	25, 397	1926	41, 758	47, 857	49, 197	43, 774
1918	21, 671	26, 476	27, 373	23, 344	1927	40, 278	46, 483	45, 925	37, 709
1919	21, 133	24, 165	27, 749	24, 073	1928	32, 827	38, 915	32, 205	31, 441
1920	22, 136	27, 530	32, 026	27, 538	1929	28, 102	37, 880		

NEW ENGLAND HAVANA SEED, TYPE 52

1912					1921	26, 850	33, 872	29, 969	26, 043
1913					1922	31, 389	39, 735	39, 008	34, 821
1914				17, 480	1923	35, 337	44, 817	43, 804	39, 952
1915		27, 853		24, 359	1924	41, 780	53, 685	50, 194	44, 791
1916		31, 438		22, 732	1925	40, 944	58, 544	53, 578	48, 862
1917	21, 849	29, 515	30, 797	25, 810	1926	49, 739	56, 864	52, 955	48, 471
1918	26, 262	34, 116	31, 521	26, 662	1927	43, 524	49, 565	44, 582	42, 408
1919	26, 082	31, 370	31, 322	23, 831	1928	40, 889	45, 376	46, 066	36, 905
1920	26, 407	33, 538	35, 087	28, 252	1929	38, 976	39, 946		

TABLE 173.—*Tobacco: Stocks in hands of dealers and manufacturers, first of each quarter, 1912–1929*—Continued

NEW YORK HAVANA SEED, TYPE 53

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*		*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1912				5,239	1921	2,647	4,487	4,022	3,547
1913		5,853		4,989	1922	3,554	5,740	4,985	4,535
1914		6,053		3,721	1923	3,628	4,235	3,982	3,302
1915		5,475		4,250	1924	3,289	4,098	3,524	3,183
1916		6,305		3,989	1925	2,859	4,159	4,393	4,438
1917	3,065	3,634	2,882	3,089	1926	3,991	5,284	4,974	4,577
1918	2,558	3,446	3,123	2,654	1927	3,783	4,425	3,509	3,196
1919	[illegible]	3,607	3,018	2,343	1928	2,673	2,601	2,608	2,279
1920	2,763	3,114	3,376	2,479	1929	2,054			

WISCONSIN CIGAR LEAF, TYPES 54 AND 55

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912				71,157	1921	77,181	102,405	103,535	93,475
1913		[illegible]		72,088	1922	82,767	130,690	132,009	120,573
1914		[illegible]		71,334	1923	102,653	125,742	126,919	117,166
1915		[illegible]		78,891	1924	99,798	105,828	116,353	110,005
1916		86,796		59,783	1925	97,749	107,438	110,344	98,223
1917	46,473	62,592	66,877	53,051	1926	83,895	114,828	105,421	93,205
1918	40,714	64,947	65,207	50,784	1927	82,781	107,151	96,658	83,058
1919	44,411	72,145	79,407	68,713	1928	69,925	94,135	84,924	72,543
1920	54,758	71,221	84,292	85,344	1929	62,359	97,345	97,380	

NEW ENGLAND SHADE GROWN, TYPE 61

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912					1921	6,793	6,314	6,452	7,654
1913					1922	9,087	8,811	7,706	7,512
1914				1,226	1923	9,487	9,255	7,644	9,044
1915		2,305		2,195	1924	12,630	11,479	11,174	9,705
1916		2,605		1,913	1925	12,181	10,633	9,493	10,412
1917	2,477	3,463	3,582	2,833	1926	11,734	9,430	6,840	6,416
1918	3,790	6,281	4,825	4,594	1927	8,659	7,606	6,494	6,492
1919	5,757	6,280	6,839	5,727	1928	8,363	7,878	5,878	6,815
1920	7,990	8,019	5,492	5,218	1929	8,722	8,749		

MISCELLANEOUS [1]—EASTERN OHIO EXPORT

	Jan. 1	Apr. 1	July 1	Oct. 1		Jan. 1	Apr. 1	July 1	Oct. 1
1912				2,709	1921	7,565	11,015	11,206	9,356
1913		3,006		702	1922	6,865	6,630	6,078	6,536
1914		2,473		1,769	1923	4,206	4,506	3,577	2,986
1915		3,206		4,199	1924	2,260	2,283	2,080	2,029
1916		2,750		1,890	1925	1,809	2,667	2,482	1,519
1917	1,813	1,947	2,081	1,939	1926	1,553	1,812	1,609	1,165
1918	2,521	3,742	5,149	4,985	1927	1,375	1,520	1,501	946
1919	5,557	5,575	7,092	6,644	1928	1,501	1,673	1,415	985
1920	7,837	8,040	8,256	9,135	1929	1,614			

Bureau of Agricultural Economics.

[1] Not including small quantities of other miscellaneous, e. g., Louisiana perique.

TABLE 174.—*Tobacco: Exports, by types, 1923–1928*

Year beginning Oct. 1	Flue-cured, types 11–14 [1]	Virginia fire-cured, type 21	Kentucky and Tennessee fire-cured, types 22 and 23	Burley, type 31	Southern Maryland, [2] type 32	Green River, type 36
	Million pounds	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*	*Million pounds*
1923	266.0	27.4	167.1	7.7	19.2	16.2
1924	207.5	25.7	125.3	6.0	13.7	16.8
1925	324.4	19.3	110.0	5.8	12.3	14.4
1926	288.7	22.0	128.4	18.1	13.8	14.2
1927	328.9	21.2	84.7	7.1	12.6	8.1
1928	414.4	18.1	75.4	6.1	13.1	9.9

Bureau of Agricultural Economics. Compiled from reports of the Bureau of Foreign and Domestic Commerce.

[1] Year beginning July 1.

[2] Includes eastern Ohio.

TABLE 175.—*Tobacco, unmanufactured: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	52, 768	381, 127	77, 690	477, 488	67, 906	487, 058	102, 754	511, 868	74, 797	583, 850
Dutch East Indies	8, 074	161, 265	6, 148	202, 646	10, 798	162, 728	14, 413	169, 563	[1] 11, 262	[1] 115, 677
Brazil	620	60, 164	3, 260	76, 830	3, 624	61, 044		70, 294		65, 274
Bulgaria	0	4, 310	0	74, 179	0	60, 546	0	59, 391	0	49, 381
Philippine Islands	45	26, 018	531	38, 420	785	33, 164	732	53, 912	816	49, 371
Greece	12, 024	18, 113	72	91, 952	0	120, 552	0	116, 231	0	107, 812
British India	6, 538	28, 874	14, 431	40, 865	16, 197	42, 095	16, 395	39, 401	16, 560	42, 167
Dominican Republic	0	22, 395	0	49, 075	0	21, 504	0	44, 750	0	31, 014
Cuba	141	37, 743	0	33, 628	0	40, 234	0	19, 602		
Algeria	4, 776	11, 681	6, 994	24, 625	9, 945	39, 668	11, 106	28, 696	11, 523	40, 474
Paraguay	0	11, 361	0	18, 883	0	10, 920	0	10, 138		
Russia	1, 084	23, 283	0	2, 672	0	6, 281	0	7, 582	0	12, 670
Hungary	0	0	4, 602	4, 664	10, 433	3, 240	7, 886	8, 757	7, 523	15, 185
Ceylon	0	4, 093	2	2, 852	3	1, 973	14	1, 554		1, 643
PRINCIPAL IMPORTING COUNTRIES										
Germany	163, 427	116	270, 225	578	135, 346	672	210, 918	545	244, 290	683
Netherlands	57, 218	3, 786	67, 603	3, 230	70, 952	3, 322	68, 159	3, 473	71, 297	3, 083
United Kingdom	117, 956	4, 603	176, 598	5, 011	186, 190	3, 853	212, 538	8, 166	208, 741	10, 448
Poland	0	0	49, 042	31	27, 434	2, 487	33, 663	506	22, 568	335
France	63, 914	26	119, 014	551	98, 090	695	91, 108	141	67, 756	510
Spain	51, 026	0	56, 448	0	25, 758	0	51, 826	0		
China	15, 113	25, 487	73, 558	27, 495	100, 678	28, 969	84, 400	30, 338		
Belgium	22, 094	33	43, 471	105	41, 934	49	45, 450	71	45, 717	84
Czechoslovakia	0	0	45, 622	0	41, 528	28	37, 626	0	24, 919	7
Italy	47, 732	3, 008	25, 609	6, 980	12, 970	7, 033	12, 383	5, 295	13, 334	7, 214
Austria	[2] 49, 984	[2] 23, 192	25, 682	1, 392	29, 235	737	40, 034	1, 983	33, 024	2, 490
Argentina	14, 988	41	20, 131	279	24, 137	366	23, 314	588		
Egypt	19, 005	0	16, 709	0	16, 370	0	15, 929	0	17, 117	0
Norway	3, 994	0	4, 360	0	4, 981	0	5, 103	0	5, 131	0
Canada	17, 891	433	14, 848	2, 516	16, 100	5, 508	18, 679	5, 867	17, 943	6, 218
Australia [3]	[4] 13, 740	0	19, 111	36	22, 040	0	22, 141	0		
Switzerland	17, 949	47	9, 854	1	12, 795	0	13, 634	214	13, 896	71
Japan	1, 707	696	9, 920	3, 684	10, 284	1, 445	14, 120	8, 536	14, 573	814
Denmark	8, 774	100	10, 322	0	12, 303	7	11, 714	1	11, 874	
Sweden	9, 772	1	9, 022	157	12, 830	22	12, 794	185	8, 788	214
Irish Free State	0	0	9, 309	228	7, 896	473	10, 005	346	8, 134	191
Finland	9, 597	0	6, 686	0	6, 557	0	7, 107	0	7, 088	0
Total 36 countries	796, 961	851, 996	1, 196, 874	1, 191, 053	1, 036, 699	1, 146, 663	1, 195, 945	1, 207, 994	958, 671	1, 146, 879

Bureau of Agricultural Economics. Official sources. Tobacco comprises leaf, stems, and strippings, but not snuff.

[1] Java and Madura only.
[2] Average for Austria-Hungary.
[3] Year ended June 30.
[4] Average years ended Dec. 31.

TABLE 176.—*Apples: Production, foreign trade in the United States, and average price per barrel for Baldwin apples at Boston, 1889–1929*

Year	Production		Price per bushel received by producers Dec. 1	Car lot shipments from crop of year shown		Foreign trade year beginning July 1 [2]						Average price of Baldwins at Boston, season November to April [4]
						Domestic exports			Imports, fresh and dried in terms of fresh	Net exports [3]		
	Total	Commercial		Cars	Equivalent bushels [1]	Fresh	Dried	Dried in terms of fresh		Total	Percentage of production	
	1,000 bush.	*1,000 bush.*	*Dolls.*		*1,000 bush.*	*1,000 bush.*	*1,000 pounds*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*P. ct.*	*Dolls.*
1889	*143,106*					1,361	20,861	2,173		3,534	2.5	3.24
1890	80,142					406	6,973	726	49	1,083	1.4	4.40
1891	198,907					2,816	26,042	2,713	21	5,508	2.8	1.78
1892	120,536					1,224	7,967	830	860	1,194	1.0	2.31
1893	114,773					236	2,847	296	278	254	.2	4.21
1894	134,648					2,456	7,086	738	378	2,816	2.1	2.40
1895	219,600					1,080	26,692	2,780	153	3,707	1.7	3.10
1896	232,600					4,512	30,775	3,206	198	7,520	3.2	1.03
1897	163,728					1,816	31,031	3,233	23	5,026	3.1	3.23
1898	118,061					1,140	19,306	2,011	236	2,915	2.5	3.18
1899	*175,398*					1,580	34,964	3,642	79	5,143	2.9	2.94
1900	205,930					2,651	28,309	2,949	57	5,543	2.7	2.28
1901	136,500					1,379	15,664	1,632	42	2,969	2.2	4.07
1902	212,330					4,968	39,646	4,130	16	9,082	4.3	1.93
1903	195,680					6,055	48,302	5,031	39	11,047	5.7	2.40
1904	233,630					4,500	39,273	4,091	20	8,571	3.7	1.96
1905	136,220					3,627	27,853	2,901	99	6,429	4.7	3.59
1906	216,720					4,618	45,698	4,760	16	9,362	4.3	2.44
1907	119,560					3,149	24,238	2,525	262	5,412	4.5	2.35
1908	148,940					2,689	33,475	3,487	45	6,131	4.1	3.99
1909	*145,412*					2,766	25,077	2,612	95	5,283	3.6	2.99
1910	141,640		0.90			5,163	21,804	2,271	37	7,397	5.2	3.68
1911	214,020		.72			4,369	53,665	5,590	27	9,932	4.6	2.56
1912	235,220		.66			6,450	41,575	4,331	23	10,758	4.6	2.28
1913	145,410		.98			4,520	33,566	3,496	60	7,956	5.5	3.95
1914	253,200		.59			7,055	42,589	4,436	67	11,424	4.5	2.08
1915	230,011		.69			4,399	16,219	1,689	15	6,073	2.6	2.36
1916	193,905	80,241	.91			5,220	10,358	1,079	20	6,279	3.2	3.44
1917	166,749	67,023	1.22			1,906	2,603	271	46	2,131	1.3	4.40
1918	169,625	74,229	1.33			4,729	18,909	1,970	50	6,649	3.9	5.94
1919	*136,561*											
1919	142,086	78,477	1.84			3,152	11,819	1,231	849	3,534	2.5	6.71
1920	223,677	101,715	1.15	116,117	69,670	7,995	18,053	1,881	142	9,734	4.4	4.02
1921	99,002	64,671	1.68	89,559	53,735	3,282	12,431	1,295	1,353	3,224	3.3	6.69
1922	202,702	95,835	.99	113,961	68,377	5,269	12,817	1,335	189	6,415	3.2	4.84
1923	202,842	107,808	1.02	138,184	84,405	12,295	30,410	3,168	132	15,331	7.6	
1924	*152,967*											
1924	171,725	84,039	1.18	103,843	61,763	9,604	19,225	2,002	106	11,500	6.7	5.65
1925	172,389	99,738	1.26	127,804	77,885	11,015	24,833	2,587	74	13,528	7.8	4.88
1926	246,609	117,384	.74	133,550	80,800	21,293	32,670	3,403	84	24,612	10.0	3.42
1927	123,693	78,051	1.39	93,094	58,375	9,430	21,704	2,261	154	11,537	9.3	6.60
1928	186,893	106,383	.99	[5] 127,530	80,164	21,043	50,119	5,221	117	26,147	14.1	4.66
1929 [5]	139,754	86,919	1.32	[6] 100,233								

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices to producers are based upon returns from crop reporters.

[1] For years 1920–1922, it is assumed that the car lots averaged 600 bushels per car. For years 1923 to 1928 inclusive, the estimates of bushels shipped have been calculated according to estimated loadings in each State.

[2] Compiled from Commerce and Navigation of the United States, 1890–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce.

[3] Total exports (domestic plus foreign) minus imports.

[4] Figures 1889–1922 from Boston Chamber of Commerce reports, average of weekly quotations of price actually paid by wholesale dealers on days quoted. Figures 1924–1928 from Special Apple Market Report issued by Mass. Dept. of Agr., Div. of Markets, based on prices "for sales by original receivers."

[5] Preliminary.

[6] December forecast of total shipments from 1929 crop.

TABLE 177.—*Apples: Production, by States, 1924–1929*

State and division	Total						Commercial [1]					
	1924	1925	1926	1927	1928	1929 [2]	1924	1925	1926	1927	1928	1929 [2]
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
Maine	3,241	3,305	2,260	2,236	1,400	3,360	1,980	1,935	1,350	1,365	861	2,076
New Hampshire	1,462	1,230	1,240	1,100	1,000	974	876	711	762	690	615	594
Vermont	895	935	800	990	560	1,029	480	510	465	570	330	594
Massachusetts	3,360	3,160	4,100	2,520	2,700	2,650	2,025	1,965	2,640	1,590	1,734	1,701
Rhode Island	324	299	391	242	230	253	192	171	237	150	144	150
Connecticut	1,480	1,375	1,900	1,045	1,500	990	855	900	1,050	540	753	489
New York	22,000	32,500	40,375	13,600	21,900	16,520	11,214	18,750	18,000	8,163	12,690	10,212
New Jersey	2,800	2,660	4,310	2,697	3,290	1,880	1,836	1,821	2,832	1,833	2,238	1,290
Pennsylvania	7,800	7,300	17,000	6,300	8,460	5,973	2,340	3,033	5,388	2,550	3,129	2,286
North Atlantic	43,362	52,764	72,376	30,730	41,040	33,629	21,798	29,796	32,724	17,451	22,494	19,392
Ohio	6,350	6,300	11,900	5,600	5,880	2,660	2,082	2,034	3,018	1,623	1,647	741
Indiana	1,800	2,430	4,100	1,249	2,520	1,170	435	600	864	276	528	243
Illinois	6,400	7,300	9,000	4,450	7,150	4,725	3,300	3,645	3,870	2,250	3,720	2,520
Michigan	6,000	9,000	9,045	4,288	5,400	7,020	3,000	5,100	4,467	2,271	2,787	3,618
Wisconsin	1,378	2,106	2,158	1,200	2,160	1,749	294	471	465	270	477	396
Minnesota	850	820	1,263	854	1,230	726	114	114	171	111	114	87
Iowa	2,800	2,400	3,652	1,720	2,740	2,120	450	240	402	207	330	255
Missouri	4,300	4,100	5,015	2,104	3,380	2,800	1,764	1,938	1,857	870	1,422	1,140
South Dakota	150	62	169	200	230	140						
Nebraska	1,000	450	700	850	470	868	360	195	228	330	90	270
Kansas	2,200	1,600	1,428	1,925	820	1,310	1,032	855	930	1,347	540	864
North Central	33,228	36,568	48,430	24,440	31,980	25,288	12,831	15,192	16,272	9,555	11,655	10,134
Delaware	1,250	1,340	2,376	1,150	1,520	1,012	930	1,140	1,980	900	1,290	861
Maryland	1,850	1,900	3,500	1,700	2,190	2,200	942	972	1,800	1,200	1,326	1,365
Virginia	14,500	7,844	19,962	6,600	16,100	13,000	7,560	4,320	11,100	4,950	11,100	9,300
West Virginia	7,000	4,185	10,875	5,000	8,750	5,600	2,400	2,247	5,100	4,050	4,410	4,200
North Carolina	6,350	3,192	5,986	1,825	5,040	2,628	921	480	1,035	273	750	450
South Carolina	600	386	647	363	480	308						
Georgia	1,500	741	1,827	595	1,400	680	360	180	456	240	351	228
South Atlantic	33,050	19,588	45,113	17,233	35,480	25,428	13,113	9,339	21,471	11,613	19,227	16,404
Kentucky	5,700	2,625	6,408	720	5,700	2,000	486	210	501	75	456	159
Tennessee	4,800	1,984	5,360	1,152	3,790	2,000	318	123	375	81	264	138
Alabama	1,190	595	1,328	328	885	500						
Mississippi	270	221	324	152	250	185						
Arkansas	4,100	4,315	3,450	1,015	2,200	1,400	2,160	1,950	1,500	609	1,242	660
Louisiana	30	28	35	18	30	25						
Oklahoma	1,170	644	770	493	350	634	162	87	93	60	33	72
Texas	330	264	380	168	216	230						
South Central	17,590	10,676	18,055	4,046	13,421	6,974	3,126	2,370	2,469	825	1,995	1,029
Montana	290	80	410	295	516	420	210	42	309	153	450	375
Idaho	2,178	6,029	4,200	6,000	5,500	5,500	1,800	5,250	2,775	5,478	4,800	4,950
Wyoming	50	25	47	40	48	35						
Colorado	3,024	3,200	3,444	2,592	3,020	2,460	2,418	2,850	2,907	2,253	2,700	2,160
New Mexico	840	1,021	1,147	456	675	1,035	567	780	600	360	507	756
Arizona	70	98	112	62	76	104	21	30	33	30	24	30
Utah	600	1,300	817	660	880	500	360	900	480	450	570	240
Nevada	40	74	42	18	52	25						
Washington	22,000	29,550	34,030	25,343	33,500	26,656	18,825	26,010	25,950	22,302	30,000	24,900
Oregon	6,500	5,400	8,036	4,320	7,600	4,000	4,500	3,888	5,250	2,925	5,100	2,250
California	8,903	6,016	10,350	7,458	13,105	7,700	4,470	3,291	6,144	4,656	6,861	4,299
Far Western	44,495	52,793	62,635	47,244	64,972	48,435	33,171	43, 04	44,448	38,607	51,012	39,960
United States	171,725	172,389	246,609	123,693	186,893	139,754	84,039	99,738	117,384	78,051	106,383	86,919

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Included in "Total crop." By commercial crop is meant that portion of the total crop which is sold for consumption as fresh fruit.
[2] Preliminary.

TABLE 178.—*Apples: Car-lot shipments by State of origin, 1928–29*

State and year	Crop movement season [1]													
	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
EASTERN														
New England:	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1928 [2]			4	115	741	376	43	27	18	16	1			1,341
1929 [2]			2	188	922	467	46							
New York:														
1928 [2]		14	319	1,237	2,999	2,004	1,390	1,636	1,508	1,220	782	450	112	13,671
1929 [2]		39	230	823	1,795	1,053	725							
Pennsylvania:														
1928 [2]		8	40	140	1,184	352	275	389	287	92	22	7		2,796
1929 [2]		24	62	260	862	256	168							
Illinois:														
1928 [2]	118	693	297	1,775	1,857	128	30	32	45	33	27	11		5,046
1929 [2]	253	396	229	903	411	13	7							
Michigan:														
1928 [2]			247	416	1,278	504	42	26	41	45	28	18	6	2,651
1929 [2]		7	203	433	2,037	847	87							
Missouri:														
1928 [2]		24	53	657	646	59	43	39	63	55	83	35	1	1,758
1929 [2]	10	23	36	283	254	11	17							
Delaware:														
1928 [2]	2	490	270	203	330	13	7	15	16	6				1,352
1929 [2]	110	488	31	72	94									
Maryland:														
1928 [2]		173	134	321	785	220	55	27	6	1				1,722
1929 [2]	19	124	83	350	887	294	48							
Virginia:														
1928 [2]		152	800	4,083	8,225	3,049	1,166	1,119	659	500	204	166	159	20,282
1929 [2]		182	813	4,073	5,360	1,162	933							
West Virginia														
1928 [2]		69	240	1,295	3,182	1,058	346	227	102	57	17	15		6,608
1929 [2]	2	191	386	1,480	3,397	951	181							
Arkansas:														
1928 [2]	9	15	208	437	448	34	15	27	21	27	16	8		1,265
1929 [2]	8	11	210	85	75	5	1							
Other Eastern:														
1928 [2]	67	229	269	966	1,680	413	100	101	133	118	78	56	6	4,216
1929 [2]	110	206	327	911	935	112	41							
Total, Eastern:														
1928 [2]	196	1,867	2,881	11,645	23,355	8,210	3,512	3,665	2,899	2,170	1,258	766	284	62,708
1929 [2]	512	1,691	2,612	9,861	17,029	5,171	2,254							
WESTERN														
Idaho:														
1928 [2]		3		1,142	3,025	1,085	430	369	239	149	57	9		6,508
1929 [2]				393	4,273	1,119	461							
Colorado														
1928 [2]			1	260	1,375	710	217	64	82	79	16			2,804
1929 [2]				112	1,352	577	148							
Washington:														
1928 [2]		128	230	4,431	13,302	7,775	3,373	3,015	4,036	2,567	1,385	845	230	41,317
1929 [2]		18	102	1,981	11,313	6,210	2,521							
Oregon:														
1928 [2]		4	63	485	2,846	1,369	572	433	261	272	118	21	3	6,447
1929 [2]			2	97	927	553	176							
California:														
1928 [2]	34	1,450	1,134	1,212	1,159	372	174	201	211	163	105	68	17	6,300
1929 [2]	2	306	894	583	696	253	152							
Other Western:														
1928 [2]			21	230	839	253	31	27	21	18	5	1		1,446
1929 [2]			131	369	830	163	17							
Total, Western:														
1928 [2]	34	1,585	1,449	7,760	22,546	11,564	4,797	4,109	4,850	3,248	1,686	944	250	64,822
1929 [2]	2	324	1,129	3,535	19,391	8,875	3,475							
Total:														
1923	152	3,360	4,122	16,689	49,876	26,571	8,061	8,299	8,213	6,370	3,469	2,295	707	138,184
1924	205	2,362	3,126	14,641	39,866	20,231	6,399	5,294	4,023	3,277	2,295	1,615	509	103,843
1925	433	2,895	4,330	20,905	44,895	20,085	7,372	6,253	6,855	6,228	4,114	2,494	945	127,804
1926	260	3,840	3,387	20,950	45,321	23,251	8,365	7,969	8,020	5,348	3,596	2,355	888	133,550
1927	253	1,815	3,539	12,106	33,556	17,109	5,963	5,315	4,900	3,500	2,355	1,819	864	93,094
1928 [2]	230	3,452	4,330	19,405	45,901	19,774	8,309	7,774	7,749	5,418	2,944	1,710	534	127,530
1929 [2]	514	2,015	3,741	13,396	36,420	14,046	5,729							

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. See preceding Yearbooks for data for earlier years.

[1] Crop movement season extends from June 1 of 1 year through June of the following year.
[2] Preliminary.

TABLE 179.—*Apples: Cold-storage holdings, United States, 1915–1929*

BARRELS[1]

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	Oct. 1	Nov. 1	Dec. 1
	1,000 barrels	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*
1915	2,929	2,438	1,716	896	299	61	-------	3,093	4,213
1916	3,743	3,324	2,543	1,561	799	218	-------	2,530	3,166
1917	2,680	2,121	1,560	1,044	543	183	-------	2,558	3,195
1918	2,754	2,226	1,575	978	356	101	-------	2,915	3,280
1919	2,582	1,704	962	487	198	68	824	3,108	3,326
1920	2,693	2,092	1,385	705	274	64	452	3,516	4,570
1921	3,966	3,016	2,020	1,027	449	170	570	1,822	1,979
1922	1,742	1,424	996	561	248	74	1,219	4,133	4,319
1923	3,708	2,839	2,013	1,199	578	150	664	4,619	5,477
1924	4,962	3,993	3,024	1,925	1,113	451	543	3,551	4,167
1925	3,643	2,811	2,006	1,151	543	175	1,058	4,434	5,051
1926	4,556	3,714	2,667	1,531	727	262	601	3,933	5,458
1927	4,901	3,857	2,682	1,603	828	295	690	2,967	3,357
1928	2,758	2,038	1,358	801	415	195	1,013	4,622	4,575
1929	3,767	2,746	1,852	1,088	516	181	1,333	4,315	4,301

BOXES

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	Oct. 1	Nov. 1	Dec. 1
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1915	4,091	3,441	2,323	1,341	525	142	-------	1,789	3,685
1916	3,210	2,738	2,096	1,268	709	258	-------	2,190	3,977
1917	4,356	3,790	2,646	1,504	796	246	-------	2,216	4,483
1918	5,534	5,192	3,764	2,416	966	172	-------	2,513	4,945
1919	5,137	4,295	2,431	1,410	545	170	440	4,244	7,793
1920	8,508	7,296	5,331	2,982	1,598	447	277	2,878	6,651
1921	7,259	6,266	4,890	3,548	2,009	826	667	5,464	11,281
1922	11,061	8,667	6,282	4,107	2,088	721	669	4,164	7,271
1923	8,319	7,612	5,593	3,345	1,475	380	789	6,886	13,866
1924	14,201	11,550	8,821	5,837	2,901	949	829	6,620	9,917
1925	9,089	7,264	5,266	3,412	1,801	674	1,091	9,165	13,041
1926	11,868	10,009	7,898	5,350	2,892	1,104	1,809	9,523	15,083
1927	13,365	10,435	7,298	4,613	2,312	717	1,043	9,074	13,423
1928	12,260	9,809	7,023	4,960	2,889	1,223	1,854	12,333	17,452
1929	15,853	12,388	7,995	4,889	2,224	631	901	11,045	15,235

TOTAL, IN BUSHELS

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	Oct. 1	Nov. 1	Dec. 1
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1915	12,879	10,755	7,473	4,029	1,422	324	-------	11,067	16,323
1916	14,439	12,708	9,726	5,952	3,105	912	-------	9,780	13,476
1917	12,396	10,155	7,326	4,635	2,424	795	-------	9,888	14,067
1918	13,797	11,871	8,490	5,349	2,034	477	-------	11,256	14,784
1919	12,882	9,315	5,316	2,868	1,140	375	2,913	13,569	17,769
1920	16,587	13,572	9,486	5,097	2,418	639	1,632	13,425	20,361
1921	19,158	15,315	10,950	6,630	3,357	1,335	2,376	10,929	17,217
1922	16,287	12,939	9,270	5,790	2,832	942	4,356	16,563	20,229
1923	19,443	16,128	11,631	6,942	3,210	831	2,781	20,712	30,297
1924	29,088	23,529	17,895	11,613	6,240	2,304	2,460	17,274	22,419
1925	20,019	15,699	11,283	6,864	3,429	1,197	4,266	22,467	28,194
1926	25,536	21,153	15,900	9,942	5,073	1,890	3,612	21,321	31,458
1927	28,068	22,005	15,342	9,423	4,794	1,602	3,114	17,976	23,493
1928	20,534	15,923	11,097	7,363	4,134	1,808	4,893	26,199	31,177
1929	27,154	20,626	13,551	8,153	3,772	1,174	4,900	23,991	28,139

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] All apples, except those packed in western-style boxes, are tabulated in terms of barrels, on the basis of 3 bushels to the barrel; since Oct. 1, 1923, apples packed in bushel baskets are also included in this tabulation. Three boxes are considered the equivalent of 1 barrel.

TABLE 180.—*Apples:*[1] *International trade, average 1911–1913, annual 1925–1928*

Country	Average, 1911–1913 Imports	Average, 1911–1913 Exports	1925 Imports	1925 Exports	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928, preliminary Imports	1928, preliminary Exports
	Year ended Dec. 31									
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
United States	-------	9,870	84	10,044	54	16,170	163	15,534	112	13,635
Canada	840	3,858	459	4,011	546	3,579	631	2,902	633	2,977
France [2]	267	7,140	261	4,266	292	2,023	545	1,797	1,015	1,012
Australia [3]	78	1,140	0	1,824	0	2,702	0	1,316	-------	-------
Netherlands	105	933	152	2,178	610	583	401	1,462	391	586
Belgium	792	936	300	1,323	176	1,107	361	1,301	274	722
Italy	39	660	0	1,138	0	1,876	0	1,659	1	1,405
Rumania	6	0	0	1,083	0	769	-------	-------	-------	-------
New Zealand	[2] 51	[2] 15	38	177	31	604	36	441	21	814
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	7,686	0	13,154	0	18,339	0	13,511	0	13,407	0
Germany	14,454	93	8,581	69	8,322	15	7,891	31	9,777	17
Sweden	132	3	537	0	603	1	757	0	874	0
Egypt	-------	-------	336	0	357	1	366	2	347	[2] 2
Denmark	108	3	393	0	621	0	943	0	678	0
Irish Free State	-------	-------	489	0	525	0	449	0	441	0
Norway [2]	222	0	168	0	189	0	249	0	185	0
Finland	192	0	141	0	161	0	161	0	210	0
Brazil	81	0	142	0	203	0	128	0	-------	-------
Cuba	39	0	91	0	90	0	130	0	-------	-------
Poland	-------	-------	84	42	4	8	30	8	49	25
Total, 20 countries	25,092	24,651	25,410	26,155	31,123	29,438	26,752	26,453	28,415	21,195

Bureau of Agricultural Economics. Official sources.

[1] Foreign weights are converted to bushels on the basis of 48 pounds per bushel; domestic, one barrel equals 3 boxes (or bushels).
[2] Includes pears.
[3] Year ended June 30.

TABLE 181.—*Apples: Estimated average price per bushel, received by producers, United States, 1910–1929*

Year beginning June—	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	Weighted average[1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	112.0	76.9	73.8	73.6	77.4	89.3	100.2	115.7	118.6	124.7	138.8	139.6	88.1
1911	135.4	94.8	73.0	70.2	65.8	73.1	86.1	92.7	98.8	103.5	114.9	128.8	76.6
1912	108.0	82.5	67.5	62.2	61.3	63.5	72.6	74.3	78.4	82.4	85.0	94.0	66.8
1913	101.2	86.0	75.2	76.5	85.6	94.4	103.6	110.6	123.0	128.9	137.1	146.4	93.0
1914	135.6	91.2	68.6	61.6	56.0	57.3	66.6	69.3	73.1	73.4	80.1	90.6	62.7
1915	90.3	78.4	61.8	58.0	66.1	72.4	77.0	86.1	90.5	91.2	94.8	97.5	71.0
1916	104.9	86.5	80.7	75.6	82.5	92.0	103.4	104.3	114.4	126.9	137.1	142.9	90.7
1917	146.5	125.1	100.6	96.6	105.1	116.8	127.4	132.9	138.5	142.6	143.9	155.8	113.6
1918	144.6	125.7	114.5	118.9	129.4	138.9	150.9	148.9	159.8	190.1	203.5	220.8	137.5
1919	223.4	187.6	161.4	153.2	175.6	184.9	213.9	215.9	229.2	236.7	253.5	285.8	186.1
1920	249.1	196.7	152.1	134.8	125.9	130.7	143.2	130.8	132.8	134.7	142.2	162.3	133.8
1921	173.9	165.3	165.1	171.4	196.4	215.7	224.5	183.5	206.7	206.2	194.5	241.4	195.2
1922	202.7	181.7	100.4	94.3	93.4	101.5	108.6	131.5	142.3	144.9	156.5	178.7	109.4
1923	188.6	166.7	121.4	108.0	114.0	114.6	114.0	121.3	125.0	129.1	129.4	131.3	117.4
1924	159.3	141.3	121.6	109.8	115.9	119.5	128.2	144.9	150.7	155.4	158.4	179.2	122.1
1925	201.4	158.7	130.7	112.5	120.5	127.7	137.4	146.3	146.3	139.8	143.2	148.2	127.0
1926	168.7	133.8	103.8	88.4	80.2	81.6	87.7	97.3	98.8	100.0	103.8	113.5	88.3
1927	140.0	144.4	135.8	130.7	134.7	141.8	152.4	161.7	168.3	177.0	183.3	190.6	141.7
1928	188.7	156.0	105.5	96.6	99.4	107.9	118.5	124.1	129.9	134.1	133.5	147.9	110.3
1929	153.1	160.5	138.9	131.0	137.9	135.6	143.4	-----	-----	-----	-----	-----	-----

[1] Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of apples for each State; yearly price obtained by weighting, monthly prices by car-lot shipments.

TABLE 182.—*Apples: Average l. c. l. price to jobbers, 1927–1929*[1]

BARRELS[2]

Market, variety, and year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
NEW YORK									
Baldwin:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1927	--------	--------	5.93	6.31	6.44	7.28	8.02	8.25	8.69
1928	--------	--------	5.16	[3] 5.19	[3] 5.30	[3] 5.12	5.16	5.00	5.83
1929	--------	--------	5.74	5.72	--------	--------	--------	--------	--------
Rhode Island Greening:									
1927	--------	6.48	7.80	8.00	8.50	9.75	--------	--------	--------
1928	--------	5.12	5.42	5.22	5.16	5.40	5.20	--------	--------
1929	--------	6.10	7.05	6.84	--------	--------	--------	--------	--------
McIntosh:									
1927	7.31	7.72	8.86	9.24	9.94	10.31	--------	--------	--------
1928	--------	7.77	10.08	10.03	9.80	9.58	9.10	--------	--------
1929	8.47	7.76	8.57	8.71	--------	--------	--------	--------	--------
York Imperial:									
1927	--------	[3] 5.32	5.73	6.13	6.79	7.36	8.03	--------	--------
1928	--------	--------	4.25	4.64	4.40	--------	--------	--------	--------
1929	--------	4.69	4.93	--------	--------	--------	--------	--------	--------
CHICAGO									
Baldwin:									
1927	--------	--------	6.68	6.85	7.52	7.86	8.78	8.23	8.64
1928	--------	--------	4.75	--------	6.04	6.16	6.08	5.91	--------
1929	--------	--------	--------	--------	--------	--------	--------	--------	--------
Rhode Island Greening:									
1927	--------	7.37	8.76	9.64	9.96	--------	--------	--------	--------
1928	--------	5.96	6.14	6.49	6.05	6.24	5.99	--------	--------
1929	--------	--------	--------	--------	--------	--------	--------	--------	--------
Jonathan:									
1927	7.83	7.63	8.53	8.78	8.65	9.86	--------	--------	--------
1928	5.70	5.81	6.08	6.57	6.13	6.60	--------	7.50	--------
1929	7.37	7.18	--------	--------	--------	--------	--------	--------	--------
King (Tompkins):									
1928	--------	--------	5.12	5.51	[3] 5.25	--------	--------	--------	--------
1929	--------	--------	--------	--------	--------	--------	--------	--------	--------
Northern Spy:									
1927	--------	--------	9.35	9.98	9.83	10.00	9.78	9.66	9.54
1928	--------	--------	--------	8.00	7.94	--------	8.53	8.33	--------
1929	--------	--------	--------	--------	--------	--------	--------	--------	--------

BOXES[4]

Market, variety, and year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
CHICAGO									
Delicious:									
1927	--------	[5] 3.86	[5] 3.88	4.35	4.43	4.60	4.80	--------	--------
1928	--------	3.02	[5] 3.05	3.20	3.12	3.31	3.37	3.73	4.27
1929	--------	3.72	[5] 3.78	3.76	--------	--------	--------	--------	--------
Jonathan:									
1927	--------	[5] 2.79	[5] 3.11	--------	--------	--------	--------	--------	--------
1928	2.51	2.07	[5] 2.16	[5] 2.42	2.53	2.83	--------	--------	--------
1929	3.28	2.96	2.95	3.07	--------	--------	--------	--------	--------
Rome Beauty:									
1927	--------	[5] 3.62	[5] 3.19	3.23	3.11	[5] 3.37	[5] 3.14	--------	--------
1928	--------	2.35	[5] 2.25	2.15	2.32	2.60	2.56	--------	--------
1929	--------	--------	[5] 3.03	[5] 3.00	--------	--------	--------	--------	--------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives at these markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. See 1927 year book, p. 837, for data for 1921–1926.

[1] Commodity reports began Aug. 29, 1927 and 1928; Sept. 3, 1929. Last commodity report of season May 28, 1927; May 26, 1928; May 25, 1929.
[2] Quotations on 2½ inch stock unless otherwise stated.
[3] Less than ten quotations.
[4] Quotations on medium-large stock unless otherwise stated.
[5] Quotations include very large stock.

TABLE 183.—*Citrus fruits: Car-lot shipments, by States of origin, 1920–1928*

ORANGES [1]

State	Crop-movement season [2]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [3]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
California	46, 844	28, 376	48, 346	44, 905	34, 439	47, 017	53, 511	43, 693	68, 559
Florida	20, 859	[4] 15,718	23, 006	33, 418	25, 091	19, 625	22, 536	16, 453	32, 550
Alabama	87	145	476	600	2	338	179	312	97
Mississippi	----	----	9	13	----	8	4	15	5
Louisiana	----	----	----	3	2	1	1	251	264
Texas	----	----	----	3	3	6	9	26	33
Arizona	49	78	71	94	45	96	73	33	66
Total	67, 839	[4] 44,317	71, 908	79, 036	59, 582	67, 091	76, 313	60, 783	101, 574

GRAPEFRUIT

State	1920	1921	1922	1923	1924	1925	1926	1927	1928
Florida	11, 115	12, 943	16, 969	19, 614	20, 087	14, 269	17, 304	14, 166	21, 844
Texas	----	8	48	99	521	298	747	1, 036	1, 617
California	451	503	507	469	449	546	597	756	819
Arizona	48	62	103	155	159	218	210	211	272
Total	11, 614	13, 516	17, 627	20, 337	21, 216	15, 331	18, 858	16, 169	24, 552

LEMONS

State	1920	1921	1922	1923	1924	1925	1926	1927	1928
California	11, 836	9, 907	8, 946	13, 388	11, 680	13, 981	13, 496	12, 745	17, 424
Texas	----	----	----	1	[5] 2	----	----	----	----
Arizona	----	----	1	2	1	1	----	----	----
Total	11, 836	9, 907	8, 947	13, 391	11, 683	13, 982	13, 496	12, 745	17, 424

MIXED CITRUS [6]

State	1920	1921	1922	1923	1924	1925	1926	1927	1928
Florida	----	----	2, 631	3, 608	4, 226	3, 565	5, 313	6, 225	9, 109
California	----	----	1, 033	1, 461	1, 148	1, 605	1, 639	1, 590	1, 753
Texas	----	----	18	1	18	----	22	92	185
Arizona	----	----	3	----	10	1	10	11	24
Louisiana	----	----	----	----	----	----	----	1	1
Total	----	----	3, 685	5, 070	5, 402	5, 171	6, 984	7, 919	11, 072

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Include tangerines.

[2] Crop movement season extends as follows: Oranges, from Sept. 1 of one year through August of the following year, except in California, where the season extends from Nov. 1 through October of the following year; grapefruit, from Sept. 1 of one year through August of the following year; lemons, from Nov. 1 of one year through October of the following year; mixed citrus, from Sept. 1 of one year through August of the following year, except in California, where the season extends from Nov. 1 through October of the following year.

[3] Preliminary.

[4] Includes one car in August, 1921.

[5] Reported in October, 1924.

[6] No reports available before 1922.

TABLE 184.—*Citrus fruit production, by States, 1899, 1909, 1919–1929* [1]

Year	California			Florida [2]		Texas		Arizona		Alabama,[3] oranges	Louisiana, oranges	Mississippi, oranges
	Oranges	Grapefruit	Lemons	Oranges	Grapefruit	Oranges	Grapefruit	Oranges	Grapefruit			
	1,000 boxes	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
1899 [4]	5,882	18	874	273	12	------	------	11	1	(5)	1	------
1909 [4]	14,440	123	2,756	4,888	1,062	11	(5)	33	1	1	152	5
1919	15,265	263	3,499	--------	--------	9	3	80	29	20	37	31
1920	21,296	304	4,955	--------	--------	------	------	60	34	82	42	25
1921	12,640	360	4,050	--------	--------	------	------	80	35	82	50	30
1922	20,106	394	3,400	10,200	7,600	4	35	81	44	175	60	45
1923	24,137	363	6,732	12,900	8,400	6	65	86	65	225	75	55
1924	18,100	387	5,125	11,600	8,600	12	211	60	67	(5)	75	0
1925	24,200	600	7,316	9,100	7,300	10	200	86	90	100	100	27
1926	28,167	650	7,712	10,700	7,800	20	340	75	75	75	150	42
1927	23,000	720	6,000	8,200	7,200	30	490	54	176	110	200	------
1928	38,705	972	7,900	15,000	10,500	68	772	99	211	38	220	------
1929 [6]	23,600	1,300	5,900	9,500	6,500	128	1,275	104	243	212	187	8

Bureau of Agricultural Economics.

[1] The figures in this table of production include fruit consumed on farms, sold locally, and used for manufacturing purposes, as well as that shipped. The figures do not include fruit which ripened on the trees, but which was destroyed by freezing or storms prior to picking. For Califronia the figures relate to the crop produced from the bloom of the year shown, fruiting through the winter and through the spring and summer of the following year, being picked from Nov. 1 of the year shown to Oct. 31 of the following year. Fruit not picked until after the latter date is included with the crop of the following year. For all States except California the estimates include all fruit picked after about Sept. 1 of the year shown. The estimates for oranges include tangerines.

[2] From prospects on Dec. 1, commercial shipments of Florida citrus fruits from the 1929 crop were estimated at 8,500,000 boxes of oranges, and 5,500,000 boxes of grapefruit, compared with 13,900,000 boxes of oranges and 9,300,000 boxes of grapefruit shipped from the 1928 crop.

[3] For years 1919–1929, equivalent in standard boxes, each equal to about 2 of the "half straps" commonly used.

[4] Census. Size of boxes not specified.

[5] 500 boxes or less.

[6] As estimated from prospects on Dec. 1.

TABLE 185.—*Lemons: International trade, average 1911–1913, annual 1925–1928*

(Boxes of 74 pounds)

Country	Year ended Dec. 31									
	Average 1911–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Italy	2	8,147	1	7,078	0	7,008	0	7,345	0	6,609
Spain	0	101	0	656	0	372	-------	-------	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	[1] 1,116	0	1,895	0	1,942	0	1,827	0	[1] 1,708	0
United States	[2] 1,750	[3] 66	1,572	162	999	296	849	308	943	251
Germany	[2] 1,107	------	1,531	[4] 23	1,615	[4] 18	1,741	[4] 29	1,665	[4] 28
Belgium	[2] 763	0	[5] 825	[4] 3	[5] 98	[4] 4	[5] 95	[4] 4	[4] 1,088	[4] 4
Czechoslovakia	------	------	468	0	450	0	483	0	381	0
Canada [6]	------	------	287	0	361	0	352	0	385	0
Rumania	123	0	198	0	225	0	-------	-------	-------	-------
Poland	------	------	293	0	244	0	308	0	288	0
Netherlands	94	3	179	18	187	19	187	29.	170	35
Switzerland	------	------	140	0	146	0	153	0	165	0
Hungary	[7] 1,032	[7] 228	131	0	114	0	216	0	202	0
Total 13 countries	5,987	8,545	7,460	7,940	6,381	7,717	6,211	7,715	6,995	6,927

Bureau of Agricultural Economics. Official sources.

[1] Includes "Other citrus fruits, n. e. s.".
[2] 2-year average.
[3] 1-year only.
[4] Includes oranges and similar fruits.
[5] Oranges only.
[6] Reported in value only prior to 1925.
[7] Average for Austria-Hungary.

TABLE 186.—*Oranges: International trade, average 1911–1913, annual 1925–1928*

[Boxes of 78 pounds]

Country	Year ended Dec. 31									
	Average 1911–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*
Spain	0	14,830	0	20,199	0	20,265	-------	-------	-------	-------
Italy	3	3,476	1	4,077	1	3,835	0	4,410	0	2,246
United States	[1] 73	1,154	14	1,981	12	2,692	19	3,562	24	2,678
Palestine	-------	-------	0	1,848	0	1,885	0	2,645	0	2,151
Union of South Africa	0	-------	0	660	0	563	0	749	0	694
Brazil	0	2	0	499	0	258	0	397	-------	-------
Japan	0	353	0	369	0	491	0	479	0	460
China	-------	-------	359	233	526	231	461	313	-------	-------
Cuba	-------	111	-------	245	-------	322	-------	46	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	7,638	0	10,788	0	11,160	0	10,975	0	10,772	0
France [2]	3,198	38	3,872	122	3,816	100	3,762	32	[3] 4,142	[3] 107
Germany	3,935	-------	5,899	-------	5,375	-------	5,941	-------	7,340	-------
Canada [4]	-------	-------	1,167	0	2,133	0	2,544	0	2,212	0
Netherlands	631	9	1,850	561	1,717	456	1,631	527	1,938	666
Belgium [5]	-------	-------	-------	-------	871	-------	671	-------	-------	-------
Egypt	-------	0	501	3	315	3	393	4	250	5
Poland	-------	-------	638	0	177	1	210	0	134	0
Switzerland	372	0	374	0	437	0	419	0	494	0
Norway [2]	208	0	338	0	369	0	387	0	426	0
Sweden	166	0	265	0	320	0	360	0	399	0
Denmark	97	0	230	0	229	0	224	0	256	0
Czechoslovakia	-------	-------	430	0	460	0	417	0	384	0
Irish Free State	-------	-------	234	0	244	0	255	0	258	0
Hungary	[6] 2,110	[6] 102	236	0	220	0	350	0	360	0
Total 24 countries	18,431	20,075	27,196	30,797	28,388	31,102	29,019	13,164	29,389	9,007

Bureau of Agricultural Economics. Official sources.

[1] 2-year average.
[2] Includes lemons.
[3] Oranges only.
[4] Reported in value only prior to 1925.
[5] Included with lemons except for 1926 and 1927 imports.
[6] Average for Austria-Hungary.

TABLE 187.—*Grapefruit, Florida: Weighted average auction price per box, New York, by months, 1924–1929*

Season beginning October	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1924	-------	-------	-------	2.83	2.83	2.71	3.78	4.38	5.94	(1)	-------
1925	4.96	3.97	3.95	4.01	4.03	4.61	5.16	4.70	4.74	5.51	4.38
1926	5.35	4.07	3.40	3.58	3.75	3.67	3.59	3.66	3.80	2.44	3.66
1927	4.60	4.70	4.71	4.82	5.07	5.52	5.45	4.92	3.93	6.28	[2] 4.93
1928	4.71	4.15	3.44	3.52	3.20	3.30	3.32	3.83	4.71	6.36	3.70
1929	4.51	4.23	4.26	-------	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those formerly published in Yearbooks.

[1] Reported for one week only.

Includes a price in August of $4.51.

TABLE 188.—*Lemons, California: Weighted average auction price per box, New York, by months, 1924–1929*

Season beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1924	------	------	4.47	4.45	4.59	4.75	5.73	6.84	4.66	4.67	8.55	6.83	------
1925	4.13	4.46	3.91	4.16	5.40	4.12	4.83	3.79	4.83	4.38	3.56	4.50	4.35
1926	3.82	4.03	4.20	3.43	3.90	3.50	3.89	4.50	6.44	6.37	8.82	9.27	4.64
1927	6.92	6.13	6.33	6.03	5.19	5.54	6.42	6.04	6.97	6.11	5.59	5.08	6.08
1928	5.04	5.62	5.26	3.95	4.07	4.55	3.82	6.89	5.39	7.82	11.87	11.22	5.82
1929	8.70	8.63	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those formerly published in Yearbooks.

TABLE 189.—*Oranges, California navels: Weighted average auction price per box, New York, by months, 1924–1929*

Season beginning November	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1924	--------	--------	4.64	4.47	5.35	5.48	6.51	6.21	--------
1925	8.00	4.56	4.24	4.55	4.70	5.50	4.73	5.56	4.80
1926	6.32	5.06	4.69	4.71	4.54	4.89	4.43	5.60	4.74
1927	(1)	5.55	4.56	5.18	5.52	5.98	7.39	--------	--------
1928	5.72	4.46	4.84	3.89	3.52	4.06	3.56	3.56	4.10
1929	(1)	5.56	--------	--------	--------	--------	--------	--------	--------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those formerly published in Yearbooks.

1 Reported for one week only.

TABLE 190.—*Oranges, California valencias: Weighted average auction price per box, New York, by months, 1925–1929*

Season beginning April	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Average [1]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1925	4.80	6.28	7.43	6.40	6.47	7.58	8.23	9.90	7.15
1926	4.92	4.58	4.46	5.21	4.89	5.39	6.44	6.79	5.28
1927	4.66	4.43	4.98	5.90	6.15	6.73	7.02	6.71	6.00
1928	5.94	7.38	7.22	7.58	7.45	7.77	7.53	7.15	7.45
1929	(2)	4.40	4.58	4.13	4.85	4.73	4.85	4.77	4.63

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those formerly published in Yearbooks.

1 Includes prices in December as follows: 1925, \$2.14; 1926, \$6.69; 1927, \$5.75.

2 Reported for one week only.

TABLE 191.—*Oranges, Florida: Weighted average auction price per box, New York by months, 1924–1929*

Season beginning October—	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average [1]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1924	--------	--------	--------	3.68	4.26	5.69	6.43	7.82	8.26	--------
1925	7.45	7.19	4.00	4.25	4.41	5.02	5.80	5.87	6.72	5.10
1926	3.70	4.79	3.53	3.76	3.91	4.10	4.86	4.75	4.54	4.11
1927	3.67	6.31	5.59	5.23	5.97	6.29	6.84	8.58	9.11	6.24
1928	4.12	3.83	3.55	3.45	3.30	3.30	3.55	3.33	2.99	3.40
1929	3.42	4.04	4.21	--------	--------	--------	--------	--------	--------	--------

Bureau of Agricultural Economics. Compiled from reports of California Fruit Growers Exchange. Prices weighted by number of boxes sold. These prices are a new series and are not comparable with those formerly published in Year books.

1 Includes prices in other months as follows: 1924, \$8.49 in July; 1926, \$3.12 in July; 1928, \$2.92 in July, and \$2.29 in August.

TABLE 192.—*Cherries: Commercial production, by States, imports and exports, 1923–1929*

Year	Commercial production										Imports, year beginning July 1			Exports, year beginning July 1, canned [1]
	New York	Wisconsin	Montana	Idaho	Colorado	Utah	Washington	Oregon	California	9 States	Natural, in brine	Prepared or preserved	Total	
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1000 pounds*
1923	12,843	------	------	------	5,500	------	------	------	------	------	[2] 2,970	[2] 1,380	[2] 4,350	1,675
1924	15,356	8,825	225	2,600	650	3,800	------	------	13,500	44,956	4,937	9,175	14,112	1,612
1925	14,656	3,150	270	3,200	3,600	5,500	------	6,250	12,000	48,626	2,904	11,153	14,057	1,688
1926	15,857	8,938	336	3,900	7,000	5,300	9,100	14,000	20,000	84,431	5,733	15,974	21,707	2,111
1927	9,851	2,812	300	2,200	4,200	3,800	3,100	10,500	12,000	48,763	15,136	1,048	16,184	1,719
1928	8,409	9,500	120	4,100	1,500	4,600	8,500	11,500	18,500	66,729	13,194	384	13,578	2,202
1929 [3]	12,734	4,375	260	4,000	4,500	4,000	7,500	8,400	16,000	61,769	------	------	------	------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board

[1] Fresh cherries not separately reported.
[2] Beginning Jan. 1, 1924.
[3] Preliminary.

TABLE 193.—*Cranberries: Production and farm value, United States, 1914–1929*

Year	Production	Price per barrel received by producers, Dec. 1	Farm value	Year	Production	Price per barrel received by producers, Dec. 1	Farm value
	1,000 bbls.	*Dollars*	*1,000 dolls.*		*1,000 bbls.*	*Dollars*	*1,000 dolls.*
1914	697	3.97	2,766	1922	560	10.18	5,702
1915	441	6.59	2,908	1923	652	7.15	4,664
1916	471	7.32	3,449	1924	582	9.42	5,485
1917	249	10.24	2,550	1925	569	11.20	6,370
1918	352	10.77	3,791	1926	744	7.56	5,623
1919	549	8.37	4,597	1927	496	12.28	6,089
1920	449	12.28	5,514	1928	551	14.51	7,997
1921	384	16.99	6,526	1929 [1]	542	13.09	7,088

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Price are based upon returns from crop reporters.

[1] Preliminary.

TABLE 194.—*Cranberries: Production and December 1 price, by States, 1924–1929*

State	Production						Price per barrel received by producers Dec. 1					
	1924	1925	1926	1927	1928	1929 [1]	1924	1925	1926	1927	1928	1929
	Bbls.	*Bbls.*	*Bbls.*	*Bbls.*	*Bbls.*	*Bbls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Massachusetts	325,000	429,000	430,000	370,000	335,000	395,000	9.90	11.25	7.75	12.50	15.00	13.25
New Jersey	215,000	115,000	210,000	75,000	138,000	90,000	8.75	10.75	7.00	11.00	13.00	12.00
Wisconsin	42,000	25,000	80,000	24,000	50,000	42,000	9.20	12.32	8.00	13.50	16.00	13.50
Washington	------	------	16,600	21,000	22,000	9,500	------	------	7.80	12.00	13.50	14.25
Oregon	------	------	7,000	6,000	6,000	5,000	------	------	7.50	10.50	13.50	14.50
United States	582,000	569,000	743,600	496,000	551,000	541,500	9.42	11.20	7.56	12.28	14.51	13.09

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] Preliminary.

TABLE 195.—*Cranberries: Car-lot shipments, by State of origin, 1920–1928*

State	Crop movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Massachusetts	966	644	999	1,324	1,045	[3] 1,457	3,762	1,242	1,050
New Jersey	452	637	789	713	806	427	804	290	478
Wisconsin	82	68	223	140	150	73	309	80	171
Other States	2	4	5	6	12	40	34	116	82
Total	1,502	1,353	2,016	2,183	2,013	[3] 1,997	4,909	1,728	1,781

Bureau of Agricultural Economics. Compiled from monthly reports received by the bureau from local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat, reduced to car-lot basis.

[1] Crop movement season extends from Sept. 1 of one year through April of the following year.
[2] Preliminary.
[3] Includes 1 car in August.

TABLE 196.—*Grapes: Production, farm price, imports and exports, 1922–1929*

Year	Production	Seasonal farm price per ton [1]	Value, basis seasonal farm price [1]	Foreign trade, year beginning July 1 [2]			
				Domestic exports	Imports	Net exports [3]	
						Total	Percentage of production
	Short tons	*Dollars*	*Dollars*	*Short tons*	*Short tons*	*Short tons*	*Per cent*
1922	1,981,171	48.09	95,271,520	7,011	16,326	[4] 9,315	
1923	2,227,395	31.88	71,009,078	10,128	10,015	198	(5)
1924	1,777,722	41.79	74,297,480	10,151	1,608	8,566	0.5
1925	[6] 2,202,085	32.03	66,115,000	12,134	1,415	10,735	.5
1926	[6] 2,438,413	26.66	64,604,000	15,396	1,011	14,414	.6
1927	[6] 2,605,238	26.52	65,332,000	19,410	1,735	17,747	.7
1928	[6] 2,671,076	19.75	49,740,000	27,819	1,703	26,155	
1929 [7]	2,022,417	29.36	59,387,000				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] For years 1925–1929, the average price for the States reporting price, except California, is used for computing the value of the grape crop in the less important States for which no price is determined. Price and value are based on quantities actually harvested.
[2] Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1923–1926; January and June issues, 1927–1929.
[3] Total exports (domestic plus foreign) minus total imports.
[4] Net imports equals total imports minus total exports (domestic plus foreign).
[5] Less than 0.05 per cent.
[6] Includes some quantities not harvested in California as follows: 138,000 tons in 1925, 15,000 in 1926, 142,000 in 1927, and 153,000 in 1928.
[7] Preliminary.

TABLE 197.—*Grapes: Estimated production, by States, 1926–1929*

State and division	1926	1927	1928	1929 [1]
	Tons	*Tons*	*Tons*	*Tons*
Me.	49	58	76	81
N. H.	96	91	91	130
Vt.	36	45	36	56
Mass.	616	555	476	714
R. I.	212	152	190	239
Conn.	1,275	1,087	1,314	1,620
N. Y.	106,700	51,520	85,470	81,030
N. J.	2,820	2,535	2,822	2,652
Pa.	25,110	14,850	22,680	16,200
North Atlantic	136,914	70,893	113,155	102,722
Ohio	29,100	20,000	28,700	17,150
Ind.	4,606	2,580	4,980	3,780
Ill.	6,532	3,440	6,800	6,160
Mich.	60,900	51,700	72,800	68,870
Wis.	409	250	495	434
Minn.	85	152	198	166
Iowa	6,052	5,329	6,225	6,675
Mo.	12,880	7,000	14,000	12,045
Nebr.	1,584	1,955	1,920	2,125
Kans.	3,700	3,735	3,465	3,375
North Central	125,848	96,141	139,583	120,780
Del.	1,536	1,207	1,600	1,710
Md.	1,330	1,225	1,200	1,314
Va.	2,790	2,048	2,560	2,336
W. Va.	1,696	720	1,422	954
N. C.	6,840	5,135	6,000	5,320
S. C.	1,785	1,540	1,725	1,495
Ga.	1,892	1,472	1,672	1,430
Fla.	700	610	900	888
South Atlantic	18,569	13,957	17,079	15,447
Ky.	1,274	632	1,200	912
Tenn.	1,672	950	1,368	1,254
Ala.	913	627	759	759
Miss.	300	225	259	245
Ark.	13,000	3,000	17,000	13,800
La.	42	30	38	36
Okla.	1,800	1,732	2,100	2,070
Tex.	1,200	1,260	1,440	1,520
South Central	20,201	8,456	24,164	20,596
Idaho	300	304	298	272
Colo.	320	314	357	374
N. Mex.	531	458	600	608
Ariz.	900	1,900	1,785	1,890
Utah	1,300	1,320	1,520	1,660
Nev.	230	270	210	252
Wash.	2,500	3,200	4,300	4,700
Oreg.	1,800	2,025	2,025	2,116
Calif.	[2] 2,129,000	[2] 2,406,000	[2] 2,366,000	1,751,000
Far western	2,136,881	2,415,791	2,377,095	1,762,872
U. S.	2,438,413	2,605,238	2,671,076	2,022,417

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.
[2] The totals shown for California include 15,000 tons not harvested in 1926, 142,000 tons not harvested in 1927, and 153,000 tons not harvested in 1928.

TABLE 198.—*Grapes: Car-lot shipments, by State of origin, 1920–1929*

State	Crop movement season [1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York [3]	5,904	2,535	7,720	4,312	5,641	3,763	7,242	3,050	3,752	2,422
Pennsylvania	1,223	390	1,558	847	1,166	589	1,350	689	1,076	877
Michigan	5,046	1,292	6,020	4,202	4,680	398	3,081	2,023	1,571	1,695
Iowa	104	77	237	217	79	50	176	196	234	309
Missouri	27	4	128	58	101	166	686	108	415	215
Arkansas	14	3	38	33	243	394	1,170	108	998	510
Washington	8	64	47	62	83	191	125	167	235	218
California [3]	28,832	33,344	43,952	55,348	57,695	76,066	64,327	75,925	73,157	58,502
Other States	152	108	219	257	245	261	433	411	332	369
Total [3]	41,310	37,817	59,919	65,336	69,933	81,878	78,590	82,677	81,770	65,117

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from June 1 through December of a given year.
[2] Preliminary.
[3] Figures for certain States include shipments in succeeding crop year as follows: California, 1920, January, 1 car; 1921, January, 2 cars; 1922, January, 7 cars; 1923, January, 13 cars; 1924, January, 6 cars; February, 2 cars; 1925, January, 21 cars; 1926, January, 2 cars; February, 1 car; 1927, January, 7 cars; February, 2 cars; 1928, January, 31 cars; February, 8 cars; March, 1 car; New York, 1928, January, 1 car; February, 1 car.

TABLE 199.—*Grapes: Weighted seasonal averages of auction sales of California grapes in 11 markets,[1] 1925–1929*

Variety	Unit	Packages					Average price per package				
		1925 [2]	1926 [3]	1927 [4]	1928 [5]	1929	1925 [2]	1926 [3]	1927 [4]	1928 [5]	1929
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alicante Bouschet	Lug	2,611	3,167	4,475	4,966	4,759	2.02	1.65	1.59	1.22	1.29
Carignane	do	795	774	1,313	1,710	542	1.48	1.47	1.32	1.06	1.14
Cornichon	Crate	352	229	189	57	25	1.35	1.27	1.20	1.15	1.22
Do	Lug	401	396	386	499	289	1.23	1.20	1.15	1.04	1.27
Emperor	Crate	206	107	67	10	-------	1.10	1.39	1.11	1.04	------
Do	Lug	239	226	169	92	56	.96	1.38	1.16	1.16	1.62
Malaga	Crate	1,872	1,544	1,214	517	123	1.36	1.28	1.28	1.24	1.33
Do	Lug	2,339	2,193	2,505	2,611	1,903	1.03	1.11	1.19	1.16	1.37
Mataro	do	340	193	299	319	193	1.68	1.37	1.30	.96	1.14
Mission	do	1,039	499	530	585	270	1.12	1.31	1.06	.88	1.23
Muscat (type)	do	3,117	2,429	4,660	4,888	2,754	.97	1.02	1.02	.81	1.06
Petit Syrah	do	220	244	316	365	257	1.41	1.27	1.35	.96	1.15
Sultanina (Thompson Seedless)	Crate	1,537	866	1,081	479	261	1.31	1.24	1.42	1.03	1.48
Do	Lug	2,488	886	1,450	2,003	2,458	1.04	1.09	1.31	1.05	1.48
Flame Tokay	Crate	881	726	678	241	157	1.37	1.50	1.46	1.51	1.55
Do	Lug	2,327	1,769	2,107	2,520	1,698	1.13	1.40	1.38	1.32	1.41
Zinfandel	do	1,385	1,017	1,592	1,679	1,402	1.54	1.22	1.30	1.00	1.14
Total	Packages	22,149	17,265	23,401	23,550	17,147	------	------	------	------	1.36

Bureau of Agricultural Economics. Compiled from daily reports of the fruit and vegetable market news service. Principal varieties only shown.

[1] Baltimore, Boston, Chicago, Cincinnati, Cleveland, Detroit, Minneapolis, New York, Philadelphia, Pittsburgh, and St. Louis.
[2] Aug. 3 to Nov. 14.
[3] Aug. 5 to Nov. 6.
[4] Aug. 2 to Nov. 12.
[5] July 19 to Nov. 30.

TABLE 200.—*Grapes: Average l. c. l. price to jobbers, specified markets, October 1924–1929*

Year	New York Concord, 12-quart baskets				Michigan Concord, 4-quart baskets		
	Boston	New York	Philadelphia	Pittsburgh	Chicago	Minneapolis	St. Louis
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1924	91	84	90	85	28	----------	30
1925	102	114	104	109	43	46	39
1926	61	62	56	60	18	27	22
1927	56	61	64	64	25	30	27
1928	60	54	49	51	21	26	23
1929	50	54	51	48	20	25	23

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

TABLE 201.—*Olive oil (including inedible): International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average, 1909–1913 [1]		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Principal exporting countries:										
Spain	30	86, 454	3	112, 990	9	213, 186	-------	-------	-------	-------
Italy	[2] 6, 643	75, 130	662	94, 901	3, 141	52, 044	1, 220	76, 527	3, 508	29, 747
Greece	0	22, 272	181	59, 437	0	9, 733	0	20, 389	0	16, 715
Tunis	2, 020	18, 090	3, 694	37, 071	613	49, 012	486	56, 707	2, 472	30, 818
Algeria	[2] 974	[2] 11, 566	153	25, 254	139	27, 288	85	13, 190	38	48, 096
Portugal	[2] 2, 020	[2] 5, 492	[3] 2, 254	[3] 3, 957	[3] 4, 709	[3] 4, 375	-------	-------	-------	-------
Yugoslavia	0	0	1, 015	455	1, 012	281	559	1, 289	1, 319	1, 120
Morocco	267	375	219	57	279	3, 656	306	142	-------	-------
Principal importing countries:										
United States	39, 903	0	142, 133	0	128, 731	0	124, 151	0	131, 213	0
Argentina	48, 248	0	79, 705	[3] 0	[3] 91, 174	[3] 0	[3] 77, 066	[3] 0	-------	-------
France	[2] 42, 502	12, 935	37, 859	9, 112	45, 930	11, 670	29, 855	18, 643	43, 803	19, 123
United Kingdom	22, 950	823	17, 270	291	17, 983	325	18, 980	392	20, 745	253
Cuba	0	0	17, 273	0	17, 319	0	-------	-------	-------	-------
Uruguay	4, 249	0	12, 738	0	13, 618	0	10, 326	0	-------	-------
Chile	7, 255	0	9, 222	0	[3] 14, 590	[3] 0	[3] 13, 998	[3] 0	-------	-------
Brazil	8, 409	0	13, 297	0	11, 262	0	9, 661	0	20, 005	0
Macao (Portuguese China)[3]	0	0	10, 275	3, 191	5, 302	3, 437	-------	-------	-------	-------
Norway	3, 458	33	4, 722	0	6, 148	0	7, 006	0	7, 163	0
Palestine	0	0	5, 039	248	3, 627	325	4, 421	2, 140	8, 310	454
Switzerland	4, 138	71	3, 542	0	3, 355	0	2, 881	7	3, 734	0
Egypt	4, 803	0	3, 344	34	2, 934	38	1, 911	29	2, 196	33
Bulgaria	4, 003	7	2, 576	0	1, 397	0	1, 021	0	576	0
Canada	1, 593	0	2, 378	0	3, 532	0	4, 448	0	5, 132	0
Belgium	[2] 4, 295	[2] 582	1, 829	52	1, 528	36	797	17	1, 314	47
Germany	6, 085	0	3, 362	35	1, 837	34	2, 438	50	2, 919	55
Rumania	7, 328	0	2, 016	0	1, 901	1	-------	-------	-------	-------
Australia	510	11	[3] 1, 121	[3] 0	[3] 1, 413	[3] 1	[3] 1, 351	[3] 1	-------	-------
Peru	[2] 684	[2] 77	1, 011	0	1, 238	0	917	0	-------	-------
Czechoslovakia	0	0	721	17	966	36	911	62	1, 120	4
Sweden	889	2	498	3	405	5	312	4	453	4
Japan	126	0	316	0	357	0	309	0	-------	-------
Philippine Islands	360	0	266	0	348	0	328	0	-------	-------
Netherlands	[2] 282	[2] 205	191	8	171	5	150	17	209	4
Denmark	146	0	150	6	101	5	209	4	-------	-------
New Zealand	68	0	150	0	136	0	141	0	273	0
Total 35 countries	224, 238	234, 125	381, 185	347, 119	387, 205	375, 493	316, 244	189, 610	266, 828	146, 473

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

[1] International Institute of Agriculture, "Oleaginous Products and Vegetable Oils."
[2] 4-year average.
[3] International Yearbook of Agricultural Statistics.

TABLE 202.—*Peaches: Total production, foreign trade in the United States, and average price per bushel, years 1913–1929*

Year	Production	Price per bushel, received by producers [2]	Farm value	Domestic exports, year beginning July 1 [1]			
				Fresh	Dried	Canned [3]	Total in terms of fresh
	1,000 bushels	*Dollars*	*1,000 dollars*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*
1913	39,707				6,712		736
1914	54,109				14,465		1,586
1915	64,097				13,739		1,507
1916	37,505				8,188		898
1917	48,765				5,863		643
1918	33,094	1.62	53,637		4,835		530
1919	*50,686*						
1919	53,178	1.89	100,485		12,756		1,399
1920	45,620	2.10	95,970		3,573		392
1921	32,602	1.59	51,739	[4] 611	6,260		699
1922	55,852	1.34	74,717	13,170	5,586	54,624	3,163
1923	45,382	1.37	62,025	15,065	12,975	50,374	3,835
1924	*47,755*						
1924	53,848	1.26	68,084	16,172	4,668	57,390	3,240
1925	46,562	1.38	64,171	15,749	3,351	83,160	4,161
1926	[5] 69,865	1.00	68,426	14,453	6,968	81,896	4,477
1927	[5] 45,463	1.18	50,494	17,969	6,542	86,634	4,701
1928	[5] 68,369	.99	63,643	22,067	12,436	101,438	6,050
1929 [6]	45,998	1.36	62,705				

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices based upon returns from crop reporters.

[1] Dried peaches converted to terms of fresh on the basis that dried peaches equal 19 per cent of fresh. Canned peaches converted to terms of fresh on the basis that 25 pounds of fresh equal 1 dozen cans of 1 pound each; 48 pounds fresh equals 1 bushel. In practice, 1 bushel of fresh fruit is figured as the equivalent of 2 dozen cans of 1 pound each.

[2] From 1918 to 1922, Sept. 15 price; 1923–1925, Sept. 15 price in North, Aug. 15 price in South; 1926–1929, approximate average price for the season, as reported Dec. 1.

[3] Canned peaches were reported in value only prior to July 1, 1922.

[4] No exports reported prior to Jan. 1, 1922. Figures for 1921 represent exports Jan. 1, 1922, to June 30, 1922.

[5] For quantities not harvested in 1926, 1927, and 1928 see Table 203.

[6] Preliminary.

TABLE 203.—*Peaches: Production and seasonal farm price, by States, 1923–1929*

State and division	Production							Seasonal farm price per bushel [1]						
	1923	1924	1925	1926	1927	1928	1929 [2]	1923	1924	1925	1926	1927	1928	1929
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New Hampshire	40	------	34	29	26	25	26	1.62	-----	2.00	1.50	2.20	2.40	2.00
Massachusetts	205	40	218	213	140	189	165	2.70	2.30	2.50	1.80	2.10	2.30	2.10
Rhode Island	31	29	30	37	23	27	25	1.95	2.30	3.00	1.70	2.10	2.30	2.50
Connecticut	232	220	210	255	186	239	177	2.64	2.10	2.80	1.70	2.20	1.90	2.00
New York	1,700	2,178	1,920	2,300	1,140	2,400	1,470	1.81	1.93	1.90	.90	1.90	1.45	1.80
New Jersey	2,642	2,500	1,740	3,000	2,304	1,625	2,600	2.09	1.79	1.50	.70	1.50	1.35	1.15
Pennsylvania	1,907	1,715	600	2,498	947	1,867	1,157	1.83	1.91	2.40	1.00	2.00	1.55	1.75
North Atlantic	6,757	6,682	4,752	8,332	4,766	6,372	5,620	1.98	1.88	1.89	.92	1.75	1.50	1.51
Ohio	1,386	800	1,100	2,120	1,326	1,742	494	1.87	2.05	2.15	1.25	1.95	1.55	1.95
Indiana	445	240	320	900	242	605	726	2.31	2.20	2.30	1.60	2.35	1.60	1.60
Illinois	675	700	500	2,660	1,122	1,638	3,600	2.64	2.20	2.50	1.25	2.05	1.40	1.45
Michigan	1,125	464	592	1,564	578	1,156	816	1.79	2.30	2.20	1.00	2.10	1.55	1.90
Iowa	40	3	12	97	65	50	55	2.00	2.60	2.50	1.60	1.95	1.50	1.50
Missouri	1,040	860	870	1,722	340	655	1,261	1.74	1.40	1.80	1.25	1.90	1.55	1.40
Nebraska	45	2	33	50	82	6	68	2.70	2.40	2.35	1.50	1.60	2.00	1.65
Kansas	78	231	371	266	259	84	385	2.52	2.00	1.85	1.70	1.75	1.90	1.55
North Central	4,834	3,300	3,798	9,379	4,014	5,936	7,405	1.99	1.96	2.11	1.26	2.00	1.52	1.55
Delaware	225	400	155	450	287	100	378	1.50	1.40	1.55	.85	1.10	1.20	1.10
Maryland	631	600	240	700	352	465	532	1.50	1.36	1.85	.75	1.50	1.30	1.20
Virginia	504	1,500	362	1,176	400	880	928	2.10	1.20	1.90	1.00	1.60	1.40	1.00
West Virginia	526	1,000	100	1,000	202	810	580	2.05	1.60	2.20	1.25	2.10	1.50	1.55
North Carolina	260	2,500	1,500	2,250	1,300	2,590	1,400	2.05	1.28	1.60	.90	1.70	1.15	1.40
South Carolina	550	800	740	1,054	615	1,363	552	2.20	1.16	1.35	1.00	1.50	1.10	1.35
Georgia	5,248	8,342	7,304	9,400	5,943	10,000	2,880	1.65	1.01	1.40	.80	1.35	.90	1.15
Florida	120	127	115	125	69	112	94	2.25	1.70	1.65	1.60	1.75	1.35	1.70
South Atlantic	8,064	15,269	10,516	16,155	9,168	16,320	7,344	1.75	1.15	1.46	.84	1.44	.97	1.23
Kentucky	450	1,250	570	1,110	180	1,035	600	1.64	1.45	1.75	1.30	1.90	1.25	1.45
Tennessee	460	2,450	1,415	1,860	638	2,190	1,225	1.90	1.30	1.55	1.05	1.70	1.10	1.25
Alabama	779	1,230	1,312	1,159	540	1,350	504	1.38	1.17	1.60	1.10	1.50	1.10	1.30
Mississippi	260	700	712	551	279	635	444	2.00	1.79	1.55	1.40	1.65	1.45	1.50
Arkansas	1,110	2,700	2,200	2,400	1,628	3,000	2,635	1.59	1.02	1.50	1.05	1.40	1.20	1.20
Louisiana	175	230	275	228	86	211	154	2.00	1.80	2.00	1.50	1.80	1.60	1.70
Oklahoma	1,032	1,861	950	180	760	480	1,100	1.44	1.02	1.33	1.30	1.30	1.30	1.00
Texas	1,700	1,900	1,750	2,310	800	1,612	1,953	1.84	1.48	1.50	1.10	1.60	1.30	1.25
South Central	5,966	12,321	9,184	9,798	4,911	10,513	8,615	1.66	1.26	1.54	1.13	1.51	1.21	1.24
Idaho	282	102	23	297	144	335	288	1.08	2.00	1.90	1.00	1.60	1.05	1.35
Colorado	750	920	450	976	892	650	1,000	1.71	1.60	1.90	1.10	1.20	1.20	1.45
New Mexico	189	62	156	131	40	46	94	2.00	1.90	1.75	1.80	2.20	1.95	1.80
Arizona	70	40	65	91	55	66	60	2.50	2.00	1.70	1.70	2.30	2.00	1.80
Utah	802	750	100	550	561	612	542	1.29	1.50	2.00	.90	1.20	.95	1.00
Nevada	5	2	8	8	2	5	5	2.00	1.75	2.25	1.50	2.30	2.00	2.25
Washington	1,333	460	870	1,222	250	1,470	1,250	1.34	2.40	1.85	.90	1.75	1.00	1.35
Oregon	500	189	222	384	160	292	232	1.68	1.50	1.80	1.20	1.60	1.40	1.70
California	15,830	13,751	16,418	22,542	20,500	25,752	13,543	.58	.84	.86	.94	.60	.55	1.35
Far Western	19,761	16,276	18,312	26,201	22,604	29,228	17,014	.76	.98	.96	.95	.68	.56	1.35
United States	45,382	53,848	46,562	[3]69,865	[3]45,463	[3]68,369	45,998	1.37	1.26	1.38	1.00	1.18	.99	1.36

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] From 1923–1925, Sept. 15 price in North, Aug. 15 price in South; 1926–1929 approximate average price for the season as reported Dec. 1.

[2] Preliminary.

[3] The production of peaches shown above includes some estimated quantities not harvested or not utilized, as follows: 1926, 1,462,000 bushesl in Georgia and Northern States; 1927, 2,708,000 bushels in California; 1928, 2,917,000 bushels in California and 1,000,000 bushels in Georgia. Values are based on the quantity actually harvested.

TABLE 204.—*Peaches: Car-lot shipments by State of origin, 1927–1929*

State and year	Crop movement season [1]						
	May	June	July	August	September	October	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York:							
1927				2	1,015	142	1,159
1928				5	1,389	350	1,744
1929 [2]				2	820	61	883
New Jersey:							
1927			8	366	714	1	1,089
1928				15	26		41
1929 [2]			14	465	52		531
Illinois:							
1927			55	1,532	4		1,591
1928			24	1,942	9		1,975
1929 [2]		11	51	4,554	7		4,623
Michigan:							
1927				6	391		397
1928				3	474	37	514
1929 [2]					322	1	323
North Carolina:							
1927	16	87	1,577	22			1,702
1928		57	1,032	2,153			3,242
1929 [2]	4	31	1,176	17			1,228
Georgia:							
1927	249	5,420	6,207	6			11,882
1928	3	1,492	11,986	2,445			15,926
1929 [2]	95	2,088	3,102	31			5,316
Tennessee:							
1927			501	2			503
1928			26	2,785			2,811
1929 [2]			776	268			1,044
Arkansas:							
1927			1,778	2			1,780
1928		1	2,419	1,590			4,010
1929 [2]		3	2,406	265			2,674
Texas:							
1927	2		47				49
1928			240	38			278
1929 [2]		12	550	9			571
Colorado:							
1927				897	809	3	1,709
1928				498	618	1	1,117
1929 [2]				42	1,701	12	1,755
Utah:							
1927		1	2	59	736		798
1928				26	667	1	694
1929 [2]				4	544		548
Washington:							
1927			1	27	212	8	248
1928			6	693	1,020	22	1,741
1929 [2]				194	1,324	23	1,541
California:							
1927		97	1,727	8,397	4,904	20	15,145
1928	9	114	6,669	9,640	3,157		19,589
1929 [2]	5	133	1,369	4,941	3,222	123	9,793
Other States:							
1927		33	772	1,899	954	4	3,662
1928		91	720	1,720	1,442	51	4,024
1929 [2]	2	99	828	3,270	257	8	4,464
Total:							
1921	1,325	4,005	9,544	7,381	5,035	44	27,334
1922	695	3,189	7,598	11,928	13,779	1,216	38,405
1923	1	2,381	10,963	9,757	9,654	766	33,525
1924	28	1,873	14,603	13,781	7,889	[3] 1,323	39,497
1925	328	4,951	17,932	9,921	7,420	306	40,858
1926	52	2,209	21,793	24,538	8,817	[4] 1,026	58,465
1927	267	5,638	12,675	13,217	9,739	178	41,714
1928	12	1,755	23,122	23,553	8,802	462	57,706
1929 [2]	106	2,377	10,272	14,062	8,219	228	35,294

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. See 1927 Yearbook, page 855, for data for earlier years.

[1] Crop movement season extends from May 1 through October of a given year.
[2] Preliminary.
[3] Includes 1 car in November.
[4] Includes 5 cars in November.

TABLE 205.—*Peaches: Average l. c. l. price to jobbers, New York and Chicago, 1919–1929*

Market, and season beginning May	6-basket carrier			Bushel basket				
	June [1]	July	August [2]	June [1]	July	August [2]	September [2]	October [2]
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York:								
1919	2.40	2.21	2.25	----------	----------	2.43	2.84	----------
1920	3.03	3.32	2.95	----------	----------	----------	2.52	----------
1921	3.34	3.04	5.00	----------	2.62	----------	----------	----------
1922	3.05	2.57	2.16	----------	2.29	1.90	1.78	1.43
1923	3.31	2.10	2.03	----------	2.18	2.16	2.48	1.94
1924	2.97	2.25	2.31	----------	1.74	2.18	2.09	2.46
1925	3.43	2.24	2.23	3.38	2.22	2.18	2.74	2.46
1926	3.14	1.79	1.28	3.05	1.74	1.48	1.26	1.17
1927	3.22	2.59	2.65	3.10	2.80	2.94	2.19	2.59
1928	3.48	2.17	1.62	3.61	2.01	1.69	2.05	1.74
1929	3.86	3.45	2.70	3.85	2.95	2.56	2.52	----------
Chicago:								
1919	2.51	2.35	----------	----------	2.99	3.17	2.65	----------
1920	2.77	3.00	3.26	2.79	2.68	3.08	2.58	----------
1921	2.47	2.95	4.23	2.74	3.20	----------	----------	----------
1922	2.72	2.65	----------	2.76	2.51	1.91	1.70	1.38
1923	2.79	2.39	2.56	----------	2.76	3.06	2.11	2.25
1924	1.98	1.88	2.07	1.84	1.86	2.30	2.91	2.17
1925	3.11	2.35	3.01	3.08	2.45	3.16	2.72	2.38
1926	3.02	1.96	1.53	2.44	2.02	1.79	1.76	1.44
1927	2.30	2.32	----------	2.35	2.66	2.81	2.30	----------
1928	3.40	2.09	1.44	----------	2.18	1.94	2.15	2.11
1929	4.08	3.45	----------	----------	2.93	2.05	2.31	----------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices.

[1] Commodity reports began June 2, 1919, June 7, 1920, 1926, and 1929, June 3, 1921 and 1924, May 25, 1922, June 5, 1923, June 1, 1925, June 11, 1927, June 20, 1928.
[2] Last reported quotations of season, Sept. 27 1919, Oct. 8, 1920, Aug. 9, 1921, Oct. 11, 1922, Oct. 13, 1923 and 1924, Oct. 3, 1925, Oct. 21, 1926, Oct. 12, 1927, Oct.15, 1928.

TABLE 206.—*Pears: Total production, foreign trade of the United States, and average price per bushel, 1913–1929*

Year	Production	Price per bushel received by producers [2]	Farm value	Domestic exports, year beginning July 1 [1]		
				Fresh [3]	Canned [3]	Total in terms of fresh
	1,000 bushels	*Dollars*	*1,000 dollars*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*
1913	10,108	----------	----------	----------	----------	----------
1914	12,086	----------	----------	----------	----------	----------
1915	11,216	----------	----------	----------	----------	----------
1916	11,874	----------	----------	----------	----------	----------
1917	13,281	----------	----------	----------	----------	----------
1918	13,362	1.38	18,419	----------	----------	----------
1919	*14,204*	----------	----------	----------	----------	----------
1919	15,006	1.84	27,614	----------	----------	----------
1920	16,805	1.66	27,865	----------	----------	----------
1921	11,297	1.71	19,268	----------	----------	----------
1922	20,705	1.06	21,943	36,785	49,358	2,823
1923	17,845	1.21	21,570	50,237	38,431	2,648
1924	18,866	1.42	26,689	41,452	53,851	3,107
1925	20,720	1.40	29,066	71,205	75,876	4,645
1926	25,249	.89	22,399	73,877	66,104	4,293
1927	18,373	1.32	24,298	51,056	52,671	3,258
1928	24,212	1.02	24,663	82,847	82,652	5,170
1929 [4]	20,903	1.43	29,952	----------	----------	----------

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board; italic figures are census returns. Prices are based upon returns from crop reporters.

[1] Canned pears converted to terms of fresh on the basis that 1 pound canned fruit is equivalent to 2 pounds fresh; 48 pounds fresh equals 1 bushel. No imports of pears reported.
[2] From 1918 to 1925, Nov. 15 price; 1926 to 1929, approximate average price for the season, as reported Dec. 1.
[3] Exports were reported in value only, prior to July 1, 1922.
[4] Preliminary.

TABLE 207.—*Pears: Production and seasonal farm price, by States, 1923–1929*

State and division	Production							Seasonal farm price per bushel[1]						
	1923	1924	1925	1926	1927	1928	1929[2]	1923	1924	1925	1926	1927	1928	1929
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*
Maine	7	12	13	6	13	10	13	2.00	1.50	1.90	1.50	1.70	1.50	1.85
New Hampshire	12	17	19	10	14	9	15	2.00	1.50	1.58	1.65	1.70	1.70	1.60
Vermont	6	12	12	6	12	6	12	2.25	1.50	1.62	2.00	2.15	2.10	1.95
Massachusetts	58	84	90	60	81	56	74	2.20	1.70	1.65	1.80	1.75	1.70	1.80
Rhode Island	10	12	13	12	12	7	11	2.50	1.70	1.75	1.60	1.80	1.80	2.00
Connecticut	37	62	60	57	54	42	52	2.25	1.65	2.00	1.90	2.00	1.60	2.00
New York	1,000	2,100	3,045	2,088	1,872	1,800	1,152	1.88	1.45	1.55	1.25	1.50	1.45	1.85
New Jersey	662	624	512	645	420	502	338	1.00	1.05	1.70	.65	1.00	1.00	1.60
Pennsylvania	612	629	468	748	400	620	272	1.21	1.29	1.55	1.15	1.50	1.20	1.55
North Atlantic	2,404	3,552	4,232	3,632	2,878	3,052	1,939	1.48	1.36	1.58	1.15	1.45	1.34	1.77
Ohio	332	326	354	430	250	395	175	1.06	1.20	1.25	.85	1.25	.90	1.40
Indiana	334	180	209	328	140	288	------	.75	.92	1.00	.65	1.05	.75	-----
Illinois	307	500	540	818	312	540	209	.94	1.01	1.20	.75	1.10	.85	.85
Michigan	1,005	810	450	889	702	819	711	1.07	1.10	1.15	.80	1.25	.95	.90
Wisconsin	16	15	15	------	------	------	468	1.31	1.50	1.50	-----	-----	-----	1.35
Iowa	62	40	45	68	41	47	52	1.11	1.80	1.70	1.20	1.50	1.20	1.35
Missouri	475	375	342	473	270	171	445	.95	1.06	1.20	.80	1.15	1.15	.95
Nebraska	24	30	18	29	36	12	40	2.06	2.20	2.00	1.60	1.60	1.90	1.50
Kansas	134	262	165	186	258	51	234	1.61	1.15	1.50	1.25	1.10	1.40	1.10
North Central	2,689	2,538	2,138	3,221	2,009	2,323	2,334	1.03	1.11	1.22	.82	1.19	.93	1.07
Delaware	370	328	180	388	128	108	248	.50	.90	1.00	.40	.60	.60	.50
Maryland	374	335	280	394	193	193	254	1.00	.82	1.00	.55	.90	.90	.80
Virginia	200	430	135	410	130	230	330	1.36	.76	1.30	.80	1.15	1.05	.90
West Virginia	41	84	34	100	12	63	49	1.30	1.39	1.70	1.15	1.65	1.25	1.40
North Carolina	65	273	158	270	100	234	205	1.71	1.41	1.70	1.15	1.35	1.10	1.20
South Carolina	88	114	87	133	68	133	104	1.30	1.42	1.50	1.20	1.30	1.10	1.25
Georgia	192	232	155	257	104	245	174	1.16	1.27	1.50	1.05	1.35	1.00	1.05
Florida	35	55	54	66	44	52	51	1.25	1.50	1.25	1.25	1.15	.95	1.05
South Atlantic	1,365	1,851	1,083	2,018	779	1,258	1,415	1.01	1.05	1.29	.81	1.07	1.00	.92
Kentucky	70	117	85	144	34	116	129	1.32	1.42	1.35	0.95	1.45	1.10	1.00
Tennessee	83	250	148	266	125	255	242	1.62	1.23	1.50	1.05	1.45	1.05	1.05
Alabama	174	224	157	211	83	234	142	1.52	1.28	1.40	.90	1.30	1.10	1.15
Mississippi	90	187	189	189	120	194	132	1.50	1.50	1.30	1.15	1.10	1.10	1.05
Arkansas	45	124	89	116	70	102	104	2.00	1.25	1.45	1.15	1.30	1.20	1.20
Louisiana	45	65	74	71	50	69	59	1.70	1.90	1.45	1.30	1.40	1.35	1.35
Oklahoma	100	235	146	81	130	72	190	1.75	1.19	1.60	1.40	1.30	1.30	1.05
Texas	340	483	386	580	345	390	455	1.57	1.21	1.35	.90	1.25	1.25	1.00
South Central	947	1,685	1,274	1,658	957	1,432	1,453	1.58	1.30	1.41	1.02	1.29	1.16	1.06
Montana	8	------	------	------	------	------	53	2.00	-----	-----	-----	-----	-----	1.70
Idaho	72	60	39	68	56	72	650	1.76	1.65	2.10	1.50	1.60	1.35	1.50
Colorado	400	550	510	564	480	185	63	1.56	1.40	1.15	.65	1.40	1.05	1.40
New Mexico	49	28	56	42	28	27	------	2.40	1.75	1.70	1.50	1.70	1.55	-----
Arizona	18	11	14	15	12	15	16	2.40	2.00	2.20	2.50	2.50	2.50	2.45
Utah	64	70	25	80	60	87	70	1.32	1.88	1.75	1.10	1.70	1.40	1.50
Nevada	7	4	7	6	2	6	3	1.90	2.00	2.00	2.00	2.50	2.50	2.55
Washington	2,700	1,750	2,300	3,220	1,670	3,700	2,800	1.10	1.65	1.70	.80	1.35	1.05	1.35
Oregon	1,580	1,225	1,500	2,100	1,900	2,700	2,356	1.08	1.70	1.60	.85	1.40	1.00	1.40
California	5,542	5,542	7,542	8,625	7,542	9,355	7,751	1.20	1.60	1.25	.84	1.30	.90	1.65
Far Western	10,440	9,240	11,993	14,720	11,750	16,147	13,762	1.18	1.61	1.38	.83	1.33	.96	1.54
United States	17,845	18,866	20,720	25,249	18,373	24,212	20,903	1.21	1.42	1.40	.89	1.32	1.02	1.43

Bureau of Agricultural Economics. Production figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

[1] From 1923–1925, Nov. 15 price; 1926–1929, approximate average price for the season as reported Dec. 1.
[2] Preliminary.

Table 208.—*Pears: Car-lot shipments, by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	3,979	2,893	5,461	1,701	2,978	4,510	2,263	1,694	1,590
New Jersey	74	23	40	76	60	52	47	19	16
Ohio	64	17	96	33	47	62	100	130	104
Indiana	71	--------	44	39	61	59	44	39	31
Illinois	1,179	33	468	318	595	614	858	228	370
Michigan	1,264	653	1,860	543	394	151	457	536	449
Delaware	290	--------	151	541	273	128	249	49	1
Maryland	54	3	36	63	30	29	33	32	27
Texas	98	115	50	99	129	121	144	213	39
Colorado	654	745	774	696	955	717	750	737	264
Utah	88	33	82	65	81	29	77	34	40
Washington	1,902	2,903	2,678	4,274	2,456	3,560	5,278	2,589	5,868
Oregon	1,006	985	1,862	2,575	1,483	2,225	2,909	2,977	4,437
California	5,016	4,500	6,465	7,143	6,312	8,718	11,673	9,215	11,003
Other States	202	150	314	423	392	282	327	252	186
Total	15,941	13,053	20,381	18,589	16,246	21,257	25,209	18,744	24,434

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from June 1 of one year through May of the following year.
[2] Preliminary.

Table 209.—*Pears: Estimated price per bushel received by producers, United States, 1910–1929*

Year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average	Year	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	--------	100.9	98.6	100.8	122.4	100.9	1920	195.5	197.9	184.2	170.1	164.5	194.1
1911	118.0	103.8	97.2	85.1	111.0	109.4	1921	165.2	175.1	186.4	194.9	198.7	172.2
1912	106.3	100.0	83.1	79.3	92.8	100.4	1922	147.1	--------	116.2	119.8	118.7	139.7
1913	109.9	119.3	95.6	93.0	97.9	111.2	1923	168.3	172.5	165.1	150.2	133.0	165.5
1914	98.8	92.8	80.4	77.5	82.5	93.7	1924	175.2	157.8	155.0	141.0	--------	165.4
1915	80.8	83.8	82.7	89.8	89.7	82.5	1925	172.6	165.2	164.2	149.7	162.6	168.2
1916	109.0	102.7	96.9	93.3	105.6	104.8	1926	137.5	119.2	117.2	105.6	97.1	127.0
1917	132.2	125.0	118.2	116.1	--------	127.4	1927	141.3	140.5	150.9	156.6	163.1	142.7
1918	168.4	157.8	147.5	140.1	156.6	161.1	1928	128.6	124.6	134.0	125.2	146.7	126.4
1919	188.4	183.0	181.3	182.0	219.5	185.7	1929	170.3	166.7	160.0	146.0	159.2	167.0

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of pears for each State; yearly price obtained by weighing monthly prices by car-lot shipments.

TABLE 210.—*Strawberries, commercial crop: Acreage, production, and price per quart, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per quart			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 quarts*	*1,000 quarts*	*1,000 quarts*	*1,000 quarts*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
Alabama	3,620	4,520	5,380	5,430	5,140	7,924	11,836	12,326	0.18	0.15	0.16	.10
Florida	2,980	3,680	3,670	5,640	5,513	6,900	5,138	12,408	.35	.29	.35	.22
Louisiana	18,500	21,100	23,200	24,360	24,975	16,711	33,083	34,104	.29	.23	.23	.21
Mississippi	920	600	1,000	1,040	1,104	960	1,500	1,685	.27	.20	.18	.14
Texas	720	1,200	1,600	2,720	1,056	2,520	2,448	3,917	.29	.22	.20	.12
Total	26,740	31,100	34,850	39,190	37,788	35,015	54,005	64,440	.28	.22	.22	.18
Second early:												
Arkansas	14,140	17,000	21,600	20,100	22,058	19,958	21,773	24,723	.19	.11	.10	.11
California (S. dist.)	820	1,620	1,600	1,280	3,317	8,664	8,320	6,400	.18	.24	.17	.18
Georgia	-------	170	170	170	-------	245	265	250	-----	.13	.12	.12
North Carolina	5,080	5,800	6,200	5,500	10,907	16,658	16,659	14,025	.16	.16	.12	.13
South Carolina	300	300	300	270	600	528	720	594	.16	.15	.12	.14
Tennessee	13,730	17,240	18,080	16,810	17,162	28,136	24,372	25,887	.18	.11	.10	.08
Virginia	8,000	9,420	9,980	8,980	19,360	22,796	23,453	16,433	.15	.14	.13	.10
Total	42,070	51,550	57,930	53,110	73,404	96,985	95,562	88,312	.17	.14	.12	.11
Intermediate:												
California (other)	2,090	2,130	2,150	2,280	8,747	9,419	8,925	7,820	.20	.22	.15	.16
Delaware	3,200	4,000	4,930	4,830	6,656	9,600	12,719	11,302	.13	.11	.08	.11
Illinois	3,060	4,280	4,700	4,790	3,461	3,595	6,228	6,802	.12	.12	.12	.09
Kansas	960	960	960	960	1,435	2,304	461	1,536	.17	.15	.14	.10
Kentucky	4,350	3,420	8,720	6,240	6,612	9,767	12,426	10,608	.15	.16	.10	.11
Maryland	10,650	12,780	13,800	11,750	34,080	28,666	22,080	21,738	.15	.12	.07	.11
Missouri	15,170	27,000	26,490	21,990	22,027	25,758	28,212	28,587	.12	.15	.11	.11
New Jersey	5,500	6,600	7,000	6,300	10,560	14,784	15,232	11,894	.15	.12	.10	.10
Oklahoma	-------	-------	1,550	1,900	-------	-------	1,240	1,824	-----	-----	.08	.10
Total	44,980	66,170	70,300	61,040	93,578	103,893	107,532	102,111	.15	.14	.10	.11
Late:												
Indiana	1,650	1,650	1,680	1,510	3,135	2,053	3,276	2,869	.13	.14	.10	.13
Iowa	2,850	2,560	2,560	2,690	3,819	4,915	3,072	4,170	.12	.18	.15	.18
Michigan	6,230	6,480	6,090	6,940	9,569	12,843	9,013	8,606	.13	.15	.15	.18
New York	4,570	4,570	4,480	4,300	11,361	13,308	7,840	9,073	.19	.18	.17	.17
Ohio	3,600	3,780	3,700	4,370	9,000	5,795	5,920	7,342	.16	.16	.18	.13
Oregon	7,320	8,400	10,000	10,500	12,766	14,280	17,000	14,700	.15	.14	.13	.15
Pennsylvania	3,100	3,260	3,190	2,870	4,650	6,650	8,358	6,199	.18	.15	.14	.14
Utah	1,000	1,300	1,400	1,300	2,400	2,544	2,800	2,080	.16	.12	.12	.12
Washington	6,090	7,670	7,900	7,900	11,327	17,411	16,866	15,405	.16	.12	.17	.18
Wisconsin	1,840	2,760	2,840	2,840	3,588	5,299	3,096	6,134	.18	.15	.21	.15
Total	38,250	42,430	43,840	45,220	71,615	85,098	77,241	76,578	.16	.15	.15	.16
Grand total	152,040	191,250	206,920	198,560	276,385	320,991	334,331	331,441	.17	.15	.14	.14

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 211.—*Strawberries: Car-lot shipments, by State of origin, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Early:										
Alabama	139	285	460	693	408	421	440	901	1,021	1,354
Florida [2]	182	150	322	1,035	580	678	341	618	545	1,632
Louisiana	626	1,525	1,576	1,678	1,865	1,076	2,342	1,659	2,850	2,859
Mississippi	16	38	89	141	108	54	53	65	88	113
Texas	2	2	9	59	76	21	45	126	148	253
Second early:										
Arkansas	650	1,087	2,165	1,342	1,613	993	1,375	2,049	2,046	2,463
California, southern district	-------	-------	20	-------	7	5	-------	35	18	10
North Carolina	363	503	1,101	1,668	2,046	1,634	1,253	2,202	2,151	1,870
South Carolina	-------	-------	8	60	70	44	22	33	71	30
Tennessee	1,150	1,839	3,634	3,279	2,902	1,637	1,253	2,425	2,180	2,461
Virginia	270	679	1,691	1,193	1,919	1,249	1,136	1,104	984	908
Other States	-------	-------	3	27	26	20	7	20	23	18
Intermediate:										
California, other	[3] 258	[3] 292	181	[3] 226	184	125	104	147	141	163
Delaware	652	866	940	924	1,307	472	671	915	621	418
Illinois	112	73	260	224	367	295	247	176	324	275
Indiana	65	25	51	26	24	29	52	44	126	105
Iowa	43	20	73	82	113	37	49	41	19	52
Kansas	-------	-------	8	19	40	20	1	57	2	63
Kentucky	265	395	772	827	467	312	581	976	1,078	851
Maryland	793	1,132	1,634	1,916	2,155	1,092	1,394	1,515	980	772
Missouri	245	451	1,963	872	990	1,497	1,435	1,986	2,637	2,074
New Jersey	363	363	274	187	402	126	207	134	186	176
Other States	-------	-------	14	3	-------	2	-------	33	46	111
Late:										
Michigan	446	454	640	408	554	39	155	114	61	45
New York	257	243	325	301	345	200	238	189	70	62
Ohio	5	19	25	8	11	-------	-------	2	-------	3
Oregon	103	116	141	115	39	57	39	110	99	103
Pennsylvania	18	5	9	9	27	-------	9	5	-------	-------
Utah	-------	3	13	23	-------	-------	-------	-------	1	2
Washington	22	140	188	177	39	42	17	93	106	59
Wisconsin	80	52	84	151	183	27	40	31	39	26
Other States	74	108	88	128	99	52	111	88	54	47
Total	7,199	10,865	18,761	17,801	18,966	12,256	13,617	17,893	18,715	19,378

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.
[2] Figures for Florida include shipments in December of preceding year as follows: 1921, 8 cars; 1924, 3 cars; 1925, 10 cars; 1927, 2 cars; 1929, 1 car.
[3] Not reported by separate divisions.

TABLE 212.—*Strawberries: Average l. c. l. price per quart to jobbers, New York and Chicago, 1919–1929*

Market, and season beginning March	New York				Chicago			
	March [1]	April	May	June [2]	March [1]	April	May	June [2]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1919	-------	38	29	24	-------	33	25	24
1920	-------	43	35	31	-------	34	32	27
1921	47	41	27	20	31	37	24	14
1922	60	37	21	16	45	29	14	12
1923	65	43	20	18	45	41	20	15
1924	-------	41	20	13	-------	46	22	17
1925	42	37	21	23	50	43	21	25
1926	-------	51	26	21	-------	42	27	17
1927	40	37	18	17	37	32	16	19
1928	50	36	20	10	51	35	27	12
1929	38	28	13	-------	46	26	16	-------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa in order to obtain comparability.

[1] Commodity reports began Apr. 7, 1919; Apr. 12, 1920; Mar. 17, 1921; Mar. 23, 1922; Mar. 28, 1923; Mar. 31, 1924; Mar. 19, 1925; Mar. 29, 1926; Mar. 7, 1927; Feb. 27, 1928; Apr. 1, 1929. (Quotations from March, 1929, taken from miscellaneous reports.)
[2] Last reported quotations for season June 20, 1919; June 10, 1920; June 3, 1921; June 6, 1922; June 13, 1923; June 17, 1924, June 9, 1925; June 19, 1926; June 20, 1927; June 12, 1928; June 7, 1929.

TABLE 213.—*Miscellaneous fruits and nuts:* [1] *Production and value, 1927, 1928, and 1929*

Crop	1927			1928			1929		
	Production	Seasonal price	Value	Production	Price Dec. 1 [2]	Value	Production	Price Dec. 1 [2]	Value
	Tons	*Dollars*	*1,000 dollars*	*Tons*	*Dollars*	*1,000 dollars*	*Tons*	*Dollars*	*1,000 dollars*
Prunes, marketed fresh:									
Idaho	22,000			21,748	30.00	652	25,360	22.00	558
Oregon	17,600	20.00	352	21,600	25.00	540	28,000	20.00	560
Washington	8,283	25.00	207	18,500	28.00	518	20,000	22.50	450
Prunes, dried:									
California	225,000	70.00	15,750	220,300	100.00	22,030	103,000	192.00	19,776
Oregon	16,000	90.00	1,440	5,000	160.00	800	29,000	160.00	4,640
Washington	3,500	95.00	332	900	160.00	144	6,500	140.00	910
Walnuts, English:									
California	51,000	330.00	16,830	25,000	420.00	10,500	39,000	320.00	12,480
Oregon	800	360.00	288	1,500	440.00	660	1,050	400.00	420
Figs, commercial:									
Dried, California [3]	12,000	45.00	540	11,500	45.00	518	15,000	90.00	1,350
Not dried, California	5,400	100.00	540	6,130	87.00	533	6,000	100.00	600
Not dried, Texas	4,879	80.00	390	6,338	65.50	415			
	1,000 boxes			*1,000 boxes*			*1,000 boxes*		
Limes: Florida	0			6	4.50	27	7	5.50	38
Pineapples: Florida	13	1.90	25	9	1.70	15	6	2.50	15

Bureau of Agricultural Economics.

[1] Incomplete. Estimates for some States are not available. See also Table 214.
[2] For products marketed prior to Dec. 1 the prices shown represent approximate averages for the season.
[3] Estimates for dried figs include some not of merchantable quality.

TABLE 214.—*Fruits and nuts: Production and value in California, 1919–1929*

Crop and year	Production	Farm value, Dec. 1	
		Per unit	Total
	Tons	*Dollars*	*1,000 dollars*
Apricots: [1]			
1919	175,000	80.00	14,000
1920	110,000	85.00	9,350
1921	100,000	50.00	5,000
1922	145,000	70.00	10,150
1923	210,000	25.00	5,250
1924	142,000	46.00	6,532
1925	150,000	54.00	8,100
1926	176,000	63.00	11,088
1927	208,000	57.00	11,856
1928	175,000	50.00	8,750
1929	195,000	63.00	12,285
Prunes: [2]			
1919	135,000	240.00	32,400
1920	97,250	130.00	12,643
1921	100,000	130.00	13,000
1922	110,000	140.00	15,400
1923	130,000	100.00	13,000
1924	139,000	110.00	15,290
1925	146,000	110.00	16,060
1926	150,000	100.00	15,000
1927	225,000	70.00	15,750
1928	220,300	100.00	22,030
1929	103,000	192.00	19,776
Plums: [1] [3]			
1919	42,000	60.00	2,520
1920	35,000	90.00	3,150
1921	42,000	53.00	2,226
1922	48,000	50.00	2,400
1923	69,000	30.00	2,070
1924	39,000	45.00	1,755
1925	51,000	40.00	2,040
1926	71,000	25.00	1,775
1927	57,000	45.00	2,565

Crop and year	Production	Farm value, Dec. 1	
		Per unit	Total
	Tons	*Dollars*	*1,000 dollars*
Plums—Contd.			
1928	66,000	37.00	2,442
1929	39,000	90.00	3,510
Cherries:			
1919	12,400	150.00	1,860
1920	17,500	200.00	3,500
1921	13,000	125.00	1,625
1922	14,000	180.00	2,520
1923	17,000	160.00	2,720
1924	13,500	140.00	1,890
1925	12,000	160.00	1,920
1926	20,000	180.00	3,600
1927	12,000	180.00	2,160
1928	18,500	150.00	2,775
1929	16,000	190.00	3,040
Grapes (all):			
1923	2,030,000	26.00	52,780
1924	1,535,000	35.00	53,725
1925	[4] 2,050,000	28.00	53,536
1926	[4] 2,129,000	25.00	52,850
1927	[4] 2,406,000	24.00	54,336
1928	[4] 2,366,000	16.06	35,538
1929	1,751,000	26.52	46,445
Raisins: [5]			
1919	182,500	210.00	38,325
1920	177,000	235.00	41,595
1921	145,000	190.00	27,550
1922	237,000	105.00	24,885
1923	290,000	45.00	13,050
1924	170,000	70.00	11,900
1925	200,000	80.00	16,000
1926	272,000	70.00	19,040
1927	285,000	60.00	17,100
1928	261,000	40.00	10,440
1929	195,000	70.00	13,650

[1] To calculate the production of apricots and plums in bushels, multiply the production in tons by 2,000 (the number of pounds in a ton) and divide by 48, the usual number of pounds in a bushel.
[2] Dried basis. To calculate in terms of fresh fruit multiply the quantity of dried prunes produced by 2½.
[3] The production shown includes a small quantity of prune varieties shipped fresh, but does not include prunes dried.
[4] The totals shown for California include 138,000 tons not harvested in 1925; 15,000 tons not harvested in 1926; 142,000 tons not harvested in 1927; and 153,000 tons not harvested in 1928. The grapes not harvested were of table varieties, except 60,000 tons of raisin grapes and 18,000 tons of wine grapes in 1928. The values shown are based on the quantity harvested.
[5] Dried basis. To calculate the approximate quantity of fresh grapes used for raisins multiply the production of raisins by 4.

TABLE 214.—*Fruits and nuts: Production and value in California, 1919–1929*—Continued

Crop and year	Production	Farm value, Dec. 1: Per unit	Farm value, Dec. 1: Total
Grapes (raisin varieties marketed fresh):[6]	*Tons*	*Dollars*	*1,000 dollars*
1923	130,000	20.00	2,600
1924	180,000	20.00	3,600
1925	378,000	20.00	7,560
1926	229,000	20.00	4,580
1927	303,000	23.00	6,969
1928	362,000	10.00	3,020
1929	238,000	30.00	7,140
Grapes (table):			
1919	200,000	75.00	15,000
1920	166,000	75.00	12,450
1921	163,000	80.00	13,040
1922	213,000	60.00	12,780
1923	312,000	40.00	12,480
1924	325,000	40.00	13,000
1925	477,000	20.00	6,780
1926	398,000	25.00	9,575
1927	490,000	26.00	9,048
1928	478,000	26.00	10,478
1929	317,000	35.00	11,095
Grapes (juice):			
1919	400,000	50.00	20,000
1920	375,000	75.00	28,125
1921	310,000	82.00	25,420
1922	450,000	65.00	29,250
1923	428,000	40.00	17,120
1924	350,000	63.00	22,050
1925	395,000	60.00	23,700
1926	414,000	45.00	18,630
1927	473,000	45.00	21,285
1928	482,000	25.00	11,600
1929	416,000	35.00	14,560
Oranges:[7]	*Boxes*		
1919	15,265,000	2.75	[8] 42,702
1920	21,296,000	2.18	[8] 47,088
1921	12,640,000	2.80	[8] 36,400
1922	20,106,000	2.00	[8] 41,000
1923	24,137,000	2.00	[8] 49,000
1924	18,100,000	3.55	[8] 65,629
1925	24,200,000	2.84	[8] 70,432
1926	28,167,000	3.05	85,909
1927	23,000,000	4.00	92,000
1928	38,705,000	2.05	79,345
1929	23,600,000	4.00	94,400
Grapefruit:			
1919	263,000		
1920	304,000		
1921	360,000		
1922	394,000		
1923	363,000		
1924	387,000		
1925	600,000		
1926	650,000	2.35	1,528
1927	720,000	3.80	2,736
1928	972,000	2.50	2,430
1929	1,300,000	2.50	3,250
Lemons:[7]			
1919	3,499,000	2.00	6,998
1920	4,955,000	2.92	14,469
1921	4,050,000	3.45	13,973
1922	3,400,000	3.30	11,220
1923	6,732,000	1.60	10,771
1924	5,125,000	3.48	17,835
1925	7,316,000	2.11	15,437
1926	7,712,000	2.81	21,671
Lemons—Contd.	*Boxes*	*Dollars*	*1,000 dollars*
1927	6,000,000	3.80	22,800
1928	7,900,000	2.60	20,540
1929	5,900,000	3.80	22,420
Figs, dried:	*Tons*		
1919	12,000	150.00	1,800
1920	12,300	90.00	1,107
1921	9,600	145.00	1,392
1922	11,000	120.00	1,320
1923	9,500	90.00	855
1924	8,500	100.00	850
1925	9,600	110.00	1,056
1926	11,350	95.00	1,078
1927	12,000	45.00	540
1928	11,500	45.00	518
1929	15,000	90.00	1,350
Olives:			
1919	8,800	160.00	1,408
1920	8,000	95.00	760
1921	8,200	90.00	738
1922	10,000	125.00	1,250
1923	17,000	65.00	1,105
1924	6,500	92.00	598
1925	14,000	60.00	840
1926	12,000	80.00	960
1927	21,500	80.00	1,720
1928	23,900	80.00	1,912
1929	22,500	75.00	1,688
Almonds:			
1919	7,250	440.00	3,190
1920	5,500	360.00	1,980
1921	6,000	320.00	1,920
1922	8,500	290.00	2,465
1923	11,000	260.00	2,860
1924	8,000	300.00	2,400
1925	7,500	400.00	3,000
1926	16,000	300.00	4,800
1927	12,000	320.00	3,840
1928	14,000	340.00	4,760
1929	4,600	480.00	2,208
Walnuts, English:			
1919	28,100	550.00	15,455
1920	21,000	400.00	8,400
1921	19,500	400.00	7,800
1922	27,000	360.00	9,720
1923	25,000	400.00	10,000
1924	22,500	460.00	10,350
1925	36,000	440.00	15,840
1926	15,000	480.00	7,200
1927	51,000	330.00	16,830
1928	25,000	420.00	10,500
1929	39,000	320.00	12,480
Peaches, Clingstones (mainly for canning):			
1926	327,000		
1927	[9] 322,000	22.50	5,783
1928	[9] 414,000	21.70	7,459
1929	179,000	68.30	12,224
Peaches, Freestone (mainly for drying):			
1926	214,000		
1927	170,000	28.80	4,896
1928	204,000	25.00	5,000
1929	146,000	41.50	6,059

Bureau of Agricultural Economics: California estimates in cooperation with California Department of Agriculture; 1929 estimates are preliminary.

[6] For years prior to 1923 the quantity of raisins marketed fresh was small and has been included with other table grapes.

[7] Representing the commercial crop year beginning Nov. 1 of the year shown; the numbers for 1929, for instance, represent the fruit that set during the season of 1929 and will be picked and marketed from Nov. 1, 1929, to Oct. 31, 1930.

[8] Includes value of quantity of grapefruit as shown below.

[9] Total production includes 65,000 tons not harvested in 1927 and 70,000 tons not harvested in 1928. The values shown are based upon the quantities harvested.

TABLE 215.—*Pecans: Estimated production*[1] *and value, by States, 1925–1929*

PRODUCTION

State	Improved					Seedling					Total				
	1925	1926	1927	1928	1929	1925	1926	1927	1928	1929	1925	1926	1927	1928	1929
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Ill	0	0	0	0	0	23	280	90	18	90	23	280	90	18	90
Mo	12	22	5	8	24	1, 183	2, 170	488	386	1, 160	1, 195	2, 192	493	394	1, 184
N. C	119	412	427	390	412	94	299	284	240	252	213	711	711	630	664
S. C	602	1, 218	902	900	752	258	406	255	200	165	860	1, 624	1, 157	1, 100	917
Ga	4, 884	6, 220	2, 927	6, 760	2, 545	1, 221	1, 185	476	840	315	6, 105	7, 405	3, 403	7, 600	2, 860
Fla	1, 207	1, 031	801	1, 500	300	709	485	343	500	100	1, 916	1, 516	1, 144	2, 000	400
Ala	1, 588	2, 593	1, 255	2, 500	1, 248	617	864	354	500	256	2, 205	3, 457	1, 609	3, 000	1, 504
Miss	1, 783	1, 508	1, 120	3, 300	1, 300	3, 311	3, 692	2, 080	3, 000	1, 200	5, 094	5, 200	3, 200	6, 300	2, 500
Ark	63	90	60	95	63	2, 037	2, 910	1, 440	1, 600	993	2, 100	3, 000	1, 500	1, 695	1, 056
La	830	719	398	750	218	4, 700	4, 811	2, 253	4, 250	1, 236	5, 530	5, 530	2, 651	5, 000	1, 454
Okla	35	52	23	20	39	6, 973	10, 258	4, 663	4, 420	7, 841	7, 008	10, 310	4, 686	4, 440	7, 880
Tex	53	838	192	765	525	5, 247	41, 062	9, 408	26, 683	16, 971	5, 300	41, 900	9, 600	27, 448	17, 496
U. S	11, 176	14, 703	8, 110	16, 988	7, 426	26, 373	68, 422	22, 134	42, 637	30, 579	37, 549	83, 125	30, 244	59, 625	38, 005

PRICE[2]

State	Improved					Seedling					Total				
	Cents	*Cents*	*Cts.*	*Cents*	*Cts.*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Ill	-----	-----	-----	-----	-----	17	17	14	15	15	17. 4	17. 1	14. 4	16. 7	15. 5
Mo	35	32	48	35	30	18	16	20	16	13	18. 2	16. 1	20. 3	16. 5	13. 3
N. C	45	44	40	36	34	30	25	27	22	20	38. 5	36. 0	34. 9	30. 6	28. 6
S. C	45	28	35	33	35	30	21	23	17	20	40. 5	26. 2	32. 4	30. 1	32. 3
Ga	37	31	34	28	31	25	15	17	13	15	34. 6	28. 4	31. 6	26. 3	29. 2
Fla	37	30	33	31	33	22	14	17	16	17	31. 5	24. 9	28. 1	27. 2	29. 0
Ala	40	34	37	30	30	25	19	20	13	16	35. 8	30. 3	33. 3	27. 2	27. 6
Miss	39	37	38	30	32	23	18	19	14	17	28. 6	23. 5	25. 7	22. 4	24. 8
Ark	34	35	35	32	35	18	15	15	14	12	18. 5	15. 6	15. 8	15. 0	13. 4
La	32	32	38	27	31	17	14	16	10. 7	15	19. 3	16. 3	19. 3	13. 1	17. 4
Okla	35	30	35	35	39	15	10	13	11	10. 2	15. 1	10. 1	13. 1	11. 1	10. 3
Tex	34	30	35	35	32	17	11	16	11. 7	11	17. 2	11. 4	16. 4	12. 4	11. 6
U. S	37. 8	32. 2	35. 6	29. 7	31. 8	18. 2	12. 1	16. 0	12. 0	11. 5	24. 1	15. 7	21. 2	17. 0	15. 5

VALUE

State	Improved					Seedling					Total				
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Ill	-----	-----	-----	-----	-----	4	48	13	3	14	4	48	13	3	14
Mo	4	7	2	3	7	213	347	98	62	151	217	354	100	65	158
N. C	54	181	171	140	140	28	75	77	53	50	82	256	248	193	190
S. C	271	341	316	297	263	77	85	59	34	33	348	426	375	331	296
Ga	1, 807	1, 928	995	1, 893	789	305	178	81	109	47	2, 112	2, 106	1, 076	2, 002	836
Fla	447	309	264	465	99	156	68	58	80	17	603	377	322	545	116
Ala	635	882	464	750	374	154	164	71	65	41	789	1, 046	535	815	415
Miss	695	558	426	990	416	762	665	395	420	204	1, 457	1, 223	821	1, 410	620
Ark	21	32	21	30	22	367	436	216	224	119	388	468	237	254	141
La	266	230	151	202	68	799	674	360	455	185	1, 065	904	511	657	253
Okla	12	16	8	7	15	1, 046	1, 026	606	486	800	1, 058	1, 042	614	493	815
Tex	18	251	67	268	168	892	4, 517	1, 505	3, 122	1, 867	910	4, 768	1, 572	3, 390	2, 035
U. S	4, 230	4, 735	2, 885	5, 045	2, 361	4, 803	8, 283	3, 539	5, 113	3, 528	9, 033	13, 018	6, 424	10, 158	5, 889

[1] Revised estimates based upon a special survey, covering the crop of 1928, carried out by field statisticians of the Division of Crop and Livestock Estimates in the different States.
[2] Dec. 1 farm prices, except that 1928 prices based mainly on the special survey.

TABLE 216.—*Fruits, canned: Production and value, census years, 1899–1927*

QUANTITY

Commodity	Standard cases[1]							Actual cases	
	1899	1904	1909	1914	1919	1921	1923	1925	1927
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Apples	646	490	1,206	1,515	2,448	2,239	2,726	3,467	2,939
Apricots	532	540	630	1,052	3,940	1,057	1,562	2,088	3,099
Blackberries	------	164	211	452	911	------	------	660	626
Loganberries	------	(2)	------	40	274	------	------	386	441
Raspberries	------	177	247	415	551	------	------	462	529
Strawberries	------	142	208	186	374	------	------	------	------
Berries, other	600	6	150	241	237	1,257	2,447	612	779
Cherries	114	319	390	543	1,363	780	2,124	1,487	1,229
Fruits for salad	------	------	------	------	------	(2)	506	914	1,101
Grapefruit	------	------	------	------	------	(2)	200	88	455
Olives, ripe	------	------	------	------	------	(2)	803	193	458
Peaches	1,449	1,305	1,467	3,408	7,707	5,417	7,039	10,526	11,305
Pears	672	789	638	1,063	2,022	1,165	1,818	3,880	2,954
Pineapples	------	------	79	94	157	------	------	------	------
Plums	------	------	220	288	572	------	273	222	224
Prunes	------	------	------	------	274	------	374	380	519
Other canned fruits	454	695	83	153	604	600	456	628	906

VALUE

Commodity	1899	1904	1909	1914	1919	1921	1923	1925	1927
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Apples	1,125	738	1,899	2,392	9,082	7,748	6,540	6,951	5,895
Apricots	1,583	1,642	1,825	3,061	25,168	4,314	5,464	7,668	12,256
Blackberries	------	285	339	789	5,080	------	------	2,190	1,725
Loganberries	------	(2)	------	------	2,139	------	------	1,539	1,641
Raspberries	------	409	642	1,137	4,279	------	------	2,338	2,614
Strawberries	------	343	538	558	3,694	------	------	------	------
Berries, other	1,093	21	236	463	1,257	5,783	10,390	3,014	3,826
Cherries	308	826	1,019	1,629	8,451	4,481	10,668	7,253	6,490
Fruits for salad	------	------	------	------	------	------	3,018	6,972	7,575
Grapefruit	------	------	------	------	------	------	792	330	1,759
Olives, ripe	------	------	------	------	------	------	4,311	1,100	2,808
Peaches	4,283	3,902	3,754	9,586	46,516	23,865	26,262	38,562	36,235
Pears	2,188	2,193	1,833	3,854	14,203	7,539	9,390	20,898	13,067
Pineapples	------	------	314	364	1,365	------	------	------	------
Plums	------	------	347	438	2,228	------	697	701	686
Prunes	------	------	------	------	1,271	------	955	1,185	1,531
Other canned fruits	731	1,364	269	626	3,216	2,838	1,737	1,938	3,623
Total value	11,311	11,723	13,015	24,897	127,949	56,568	80,224	102,639	101,731

Bureau of Agricultural Economics. Data for 1899 and 1904 compiled from Thirteenth Census of the United States, Vol. X, p. 391. Data for 1909 and 1914 from Census of Manufactures, 1914, vol. 2, pp. 377–379. Data for 1919, 1921, 1923, 1925, and 1927 from Census of Manufactures, bulletins on canning and preserving.

[1] Expressed in standard cases of 24 cans as follows: Apples, No. 3; apricots, 1899, 1904, 1909, and 1914, No. 3; 1919, 1921, and 1923, No. 2½; blackberries, No. 2; loganberries, 1914, No. 2; 1919, No. 2½; raspberries, 1904, 1909, and 1914, No. 2; 1919, No. 2½; strawberries, 1904, 1909, and 1914, No. 2; 1919, No. 2½; berries, other, 1899, 1904, 1909, and 1914, No. 2; 1919 includes blueberries, No. 2, and other berries, No. 2½; 1921 and 1923, No. 2; cherries, No. 2; fruits for salad, No. 2; grapefruit, No. 2; olives, ripe, No. 2; peaches, 1899, 1904, 1909, 1914, and 1919, No. 3; 1921 and 1923, No. 2½; pears, 1899, 1904, 1909, 1914, and 1919, No. 3; 1921 and 1923, No. 2½; pineapple, No. 3; plums, 1909 and 1914, No. 2; 1919, No. 2½; 1923, No. 2; prunes, 1919, No. 2½; 1923, No. 2; other canned fruit, 1899 and 1904, No. 2; 1909 and 1914, No. 2, except figs in 1909, No. 3, and figs and grapes in 1914, No. 3; 1919, No. 2½, except grapes, No. 2; 1921 and 1923, No. 3.

[2] Not reported separately.

TABLE 217.—*Fruits, canned: Quantity, by States and total value, 1927* [1]

State	Apples	Berries	Cherries	Peaches	Pears	Other canned fruit	Total
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Maine	137	241					378
New York	614	170	266		123	239	1,412
New Jersey					6		6
Pennsylvania	292						292
Ohio			36				36
Michigan	63	168	250	34	146	26	687
Maryland		9			13		22
Georgia				131			131
Arkansas		11					11
Texas		61				274	335
Colorado		9	60				69
Utah			38	4			42
Washington	909	665	94		352	1	2,021
Oregon	335	860	228		431	261	2,115
California		[2] 138	174	11,119	1,859	[3] 5,247	18,537
Other States	589	43	83	17	24	259	1,015
Total	2,939	2,375	1,229	11,305	2,954	[4] 6,762	[4] 27,564
Total value (1,000 dollars)	5,895	9,806	6,490	36,235	13,067	30,237	101,730

Bureau of Agricultural Economics. Compiled from Census of Manufactures, 1927.

[1] Expressed in actual cases.
[2] Includes Washington for loganberries.
[3] Includes Arizona and Massachusetts for some commodities.
[4] Includes 455,000 cases of grapefruit not reported by States.

TABLE 218.—*Asparagus for consumption fresh, commercial crop: Acreage, production, and price per crate, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per crate			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
California	9,980	10,080	10,400	10,780	1,856	1,341	1,633	927	3.26	2.99	2.27	3.12
Georgia	4,380	4,900	5,640	6,320	70	118	130	152	3.42	3.82	2.75	3.73
South Carolina	5,300	6,400	7,000	7,700	307	288	280	462	3.08	4.01	2.91	3.51
Total	19,660	21,380	23,040	24,800	2,323	1,747	2,043	1,541	3.24	3.21	2.39	3.30
Late:												
Delaware	1,500	1,500	1,920	1,920	90	81	161	192	3.00	2.70	1.65	2.85
Illinois	3,050	3,360	3,700	3,880	201	286	303	318	1.66	1.50	1.56	2.87
Iowa	150	200	200	210	9	14	14	20	1.65	2.00	2.00	2.50
Maryland	1,920	2,120	2,330	2,330	121	208	252	242	2.00	3.44	2.37	3.25
Massachusetts			1,580	1,580			130	145			3.35	3.30
Michigan	390	480	820	860	26	38	80	93	2.90	2.74	1.59	2.31
New Jersey	10,000	10,500	10,500	10,500	740	882	819	861	3.05	2.80	2.45	2.50
Oregon		160	180	200		13	16	30		1.75	2.00	2.25
Pennsylvania	1,000	1,000	1,200	1,280	68	45	91	128	2.74	3.22	2.27	2.40
Washington	860	1,300	1,740	1,740	75	130	171	150	2.36	1.60	1.97	1.99
Total	18,870	20,620	24,170	24,500	1,330	1,697	2,057	2,179	2.67	2.56	2.22	2.67
Grand total	38,530	42,000	47,210	49,300	3,563	3,444	4,100	3,720	3.03	2.89	2.31	2.93

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Crate containing approximately 24 pounds.

TABLE 219.—*Asparagus for canning, commercial crop. Acreage, production, and price per ton, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per ton			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
California	46,300	48,300	49,300	49,400	50,900	53,100	64,100	74,100	66.29	70.00	79.36	79.40
New York	150	200	200	200	100	100	100	140	224.50	225.00	220.00	210.00
Total	46,450	48,500	49,500	49,600	51,000	53,200	64,200	74,240	66.50	70.28	79.58	79.65

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

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TABLE 220.—*Asparagus: Car-lot shipments, by State of origin, 1920–1929*

State	Crop movement season[1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929[2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New Jersey	465	237	154	64	156	150	226	156	34	33
Illinois	164	170	161	93	157	165	144	158	213	146
South Carolina	89	129	143	154	185	263	364	447	463	506
Georgia	------	------	------	------	8	------	53	111	158	129
Washington	1	2	5	10	10	31	111	93	127	107
California[3]	502	362	304	458	718	1, 279	1, 503	1, 154	1, 875	1, 111
Other States	5	2	------	6	1	18	18	13	7	29
Total[3]	1, 226	902	767	785	1, 235	1, 906	2, 419	2, 132	2, 877	2, 061

Bureau of Agricultural Economics. Compiled from daily and monthly reports received from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from Mar. 1 through July of a given year.
[2] Preliminary.
[3] California includes shipments in other months as follows: 1924, 6 in February; 1925, 10 in February; 1926, 8 in October and 5 in November; 1927, 6 in October and 1 in November; 1928, 24 in October and 7 in November.

TABLE 221.—*Beans, snap, for consumption fresh, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall:[1]												
Florida	4, 980	4, 700	12, 050	4, 500	438	367	602	225	3. 05	3. 00	2. 55	3. 76
Texas	830	1, 010	1, 080	840	76	32	43	63	1. 51	1. 50	1. 13	1. 65
Total	5, 810	5, 710	13, 130	5, 340	514	399	645	288	2. 82	2. 88	2. 46	3. 30
Early:												
California	3, 000	3, 120	3, 250	3, 510	645	484	429	446	1. 76	1. 25	1. 60	1. 68
Florida	11, 030	14, 990	16, 760	16, 520	739	1, 049	838	1, 322	3. 58	2. 59	2. 10	2. 06
Texas	4, 410	5, 210	4, 950	3, 380	401	255	530	260	1. 65	1. 70	1. 57	1. 81
Total	18, 440	23, 320	24, 960	23, 410	1, 785	1, 788	1, 797	2, 028	2. 49	2. 10	1. 82	1. 94
Second Early:												
Alabama	710	960	1, 000	900	53	73	64	64	2. 34	1. 10	1. 75	1. 30
Georgia	1, 740	1, 880	1, 360	600	108	62	68	72	2. 08	. 97	1. 76	1. 20
Louisiana	6, 920	8, 910	8, 610	8, 100	388	722	405	688	2. 70	1. 37	1. 56	1. 35
Mississippi	3, 460	4, 350	5, 500	5, 000	239	222	220	335	2. 44	1. 24	2. 21	1. 18
North Carolina	3, 290	3, 880	6, 500	5, 900	293	330	566	442	1. 88	2. 06	. 99	1. 32
South Carolina	3, 500	4, 500	4, 920	4, 920	262	243	325	462	2. 32	1. 23	1. 86	1. 36
Total	19, 620	24, 480	27, 890	25, 420	1, 343	1, 652	1, 648	2, 063	2. 34	1. 44	1. 53	1. 31
Intermediate:												
Arkansas	1, 280	1, 120	1, 410	1, 340	46	68	83	84	1. 44	1. 40	. 96	1. 41
Delaware	200	150	130	140	13	18	14	16	1. 00	1. 25	1. 20	1. 75
Illinois	330	530	660	660	24	29	39	61	1. 08	2. 27	1. 14	2. 16
Maryland	4, 250	4, 250	4, 340	4, 560	382	340	326	520	1. 06	1. 75	1. 00	1. 86
New Jersey	11, 000	11, 300	12, 000	13, 200	1, 320	1, 469	1, 440	1, 386	1. 00	1. 45	1. 47	1. 27
Tennessee	1, 670	1, 000	1, 650	1, 200	134	65	124	114	1. 41	3. 19	. 93	1. 53
Virginia	2, 000	2, 000	2, 300	2, 070	264	220	214	298	1. 99	2. 67	1. 11	2. 00
Total	20, 730	20, 350	22, 490	23, 170	2, 183	2, 209	2, 240	2, 479	1. 17	1. 68	1. 31	1. 52
Late:												
Louisiana	4, 460	4, 360	3, 820	4, 720	290	235	279	354	1. 64	1. 32	1. 56	1. 10
Mississippi	910	580	620	1, 000	46	30	30	40	1. 80	1. 38	1. 98	1. 60
North Carolina	600	400	220	600	53	30	17	39	1. 00	1. 50	2. 50	1. 20
South Carolina	1, 170	800	800	900	67	60	63	112	. 64	1. 12	2. 73	1. 50
Virginia	1, 170	1, 300	1, 170	2, 000	213	176	105	300	1. 00	1. 10	. 95	. 90
Total	8, 310	7, 440	6, 630	9, 220	669	531	494	845	1. 30	1. 24	1. 64	1. 11
Grand total	72, 910	81, 300	95, 100	86, 560	6, 494	6, 579	6, 824	7, 703	1. 92	1. 77	1. 63	1. 60

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Crop planted in fall of preceding year, the marketing of which extends into the year shown.

TABLE 222.—*Beans, snap, for canning, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

State	Acreage				Production				Price per ton			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	860	600	970	1, 600	2, 000	1, 400	2, 300	3, 400	57. 00	55. 83	59. 70	60. 00
New York	5, 220	5, 530	6, 840	8, 140	6, 800	7, 700	10, 900	13, 800	76. 86	83. 71	75. 90	77. 40
Pennsylvania	1, 010	890	1, 190	1, 450	1, 200	1, 400	2, 500	1, 900	41. 83	50. 98	58. 30	57. 40
Indiana	850	850	1, 800	2, 320	700	2, 000	3, 200	3, 700	55. 00	55. 50	55. 00	55. 00
Michigan	2, 400	2, 400	2, 950	3, 840	2, 900	2, 200	4, 400	3, 500	51. 20	53. 00	58. 40	59. 20
Wisconsin	3, 460	3, 910	4, 600	5, 750	4, 200	5, 100	7, 400	6, 900	73. 83	75. 00	67. 80	71. 90
Delaware	800	400	670	670	700	600	900	900	47. 00	48. 75	43. 30	50. 00
Maryland	3, 310	3, 300	4, 360	5, 450	3, 000	5, 000	6, 500	7, 600	51. 91	54. 92	57. 50	58. 00
South Carolina	700	700	700	820	1, 000	1, 000	1, 500	1, 600	42. 00	45. 00	45. 00	50. 00
Tennessee	1, 080	1, 250	1, 220	1, 220	2, 400	1, 800	1, 800	1, 500	40. 81	50. 00	50. 00	50. 00
Mississippi	1, 550	1, 780	1, 690	1, 860	3, 300	2, 700	2, 900	1, 900	50. 00	51. 33	50. 00	50. 00
Arkansas	630	880	1, 790	2, 240	900	1, 700	2, 000	2, 700	50. 00	50. 00	51. 30	51. 00
Louisiana	800	1, 640	3, 040	3, 060	400	2, 000	2, 100	5, 200	50. 00	50. 00	50. 00	50. 00
Colorado	700	900	1, 600	2, 300	2, 200	2, 200	3, 400	6, 900	53. 33	60. 00	60. 00	58. 00
Utah	610	880	1, 020	1, 280	1, 500	2, 400	2, 400	2, 600	49. 68	53. 13	58. 30	63. 00
Washington	270	370	700	1, 050	1, 000	1, 000	1, 500	2, 100	60. 00	60. 20	60. 00	60. 00
Oregon	1, 250	650	650	750	3, 100	1, 600	2, 000	1, 700	64. 00	65. 00	65. 00	57. 50
California	700	450	470	750	3, 200	2, 000	1, 700	3, 000	81. 00	85. 00	80. 00	75. 00
Other States	1, 350	1, 540	3, 010	3, 310	1, 100	2, 200	4, 200	4, 300	57. 50	53. 98	52. 80	53. 60
Total	27, 550	28, 920	39, 270	47, 860	41, 600	46, 000	63, 600	75, 200	60. 43	62. 61	61. 18	62. 03

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

TABLE 223.—*Beans, snap: Car-lot shipments, by State of origin, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929[1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	43	28	11	33	81	62	39	31	49	69
New Jersey	90	111	68	15	100	48	56	203	110	61
Maryland	159	22	149	49	136	127	197	235	246	214
Virginia	155	79	268	101	899	570	841	877	657	1, 014
North Carolina	133	128	219	261	559	459	550	504	690	735
South Carolina	142	331	503	585	517	334	449	425	439	776
Florida	547	407	750	1, 848	1, 093	2, 083	1, 094	3, 403	1, 780	4, 150
Tennessee	20	23	63	81	248	84	174	45	119	132
Mississippi	105	79	252	47	85	88	130	143	192	309
Louisiana	35	202	90	107	439	683	588	662	822	1, 137
Texas	7	39	26	88	210	407	414	471	294	364
California	17	60	20	26	32	118	127	60	116	78
Other States	20	91	212	87	219	161	195	242	252	446
Total	1, 473	1, 600	2, 631	3, 328	4, 618	5, 224	4, 854	7, 301	5, 766	9, 485

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.

TABLE 224.—*Cabbage, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

State	Acreage				Production [1]				Seasonal farm price per ton			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall:												
South Carolina	250	300	600	350	1, 800	1, 700	2, 400	2, 900	34. 70	22. 70	46. 75	68. 50
Virginia (Norfolk)	200	100	180	180	1, 500	500	900	1, 100	16. 20	15. 00	71. 08	50. 00
Total	450	400	780	530	3, 300	2, 200	3, 300	4, 600	26. 06	21. 36	53. 33	63. 50
Early:												
California	6, 480	6, 350	6, 400	5, 800	42, 100	40, 000	38, 400	31, 900	28. 53	18. 00	31. 00	21. 50
Florida	3, 660	3, 010	2, 900	6, 500	22, 000	14, 700	16, 000	39, 000	48. 44	31. 22	36. 93	33. 60
Louisiana	3, 800	5, 880	8, 980	8, 240	20, 500	30, 000	51, 200	38, 700	52. 76	20. 96	23. 09	22. 10
Texas	14, 300	18, 530	15, 840	20, 400	82, 900	122, 300	91, 900	118, 300	29. 23	9. 76	19. 15	13. 58
Total	28, 240	33, 770	34, 120	40, 940	167, 500	207, 000	197, 500	227, 900	34, 46	14. 50	23. 91	19. 56
Second early:												
Alabama	3, 900	4, 200	2, 400	3, 000	19, 500	22, 700	11, 800	12, 000	20. 17	19. 60	62. 62	20. 00
Georgia	320	200	100	300	1, 100	1, 300	300	3, 000	38. 88	20. 89	30. 60	20. 00
Louisiana	5, 770	8, 600	7, 150	9, 350	27, 100	39, 600	37, 200	44, 900	30. 83	22. 31	42. 54	21. 70
Mississippi	1, 880	2, 110	2, 500	3, 170	13, 500	10, 600	13, 800	19, 700	26. 95	44. 75	45. 50	21. 30
North Carolina	620	780	680	850	3, 100	3, 300	3, 400	6, 000	30. 00	50. 75	54. 00	20. 00
South Carolina	3, 300	2, 300	2, 500	3, 200	28, 700	21, 600	15, 500	28, 200	28. 11	40. 28	49. 02	31. 50
Virginia (East Shore & Norfolk)	4, 000	6, 400	6, 700	7, 600	22, 400	30, 100	32, 800	41, 800	39. 43	75. 59	34. 92	25. 60
Total	19, 790	24, 590	22, 030	27, 470	115, 400	129, 200	114, 800	155, 600	29. 62	39. 79	43. 96	24. 24
Intermediate:												
Arkansas	-------	560	1, 040	980	---------	4, 500	4, 700	2, 400	-----	42. 00	14. 00	12. 50
Delaware	300	250	250	250	1, 900	1, 700	1, 400	1, 700	24. 00	28. 00	40. 00	20. 00
Illinois	900	940	1, 030	980	5, 800	6, 200	9, 300	7, 300	20. 57	14. 37	10. 60	18. 60
Iowa	1, 000	1, 080	1, 250	1, 000	7, 500	6, 900	11, 900	6, 400	11. 12	26. 37	6. 06	27. 10
Kentucky	240	240	260	160	1, 700	1, 600	1, 600	1, 600	20. 00	40. 00	15. 00	30. 00
Maryland	1, 650	1, 270	1, 400	1, 400	8, 700	7, 900	9, 000	9, 900	52. 65	52. 48	22. 40	20. 00
Missouri	860	860	950	860	6, 900	7, 300	5, 200	6, 000	13. 50	44. 22	11. 25	16. 62
New Jersey	6, 000	6, 600	6, 800	7, 500	41, 400	46, 200	39, 400	37, 500	24. 00	29. 20	30. 00	28. 00
New Mexico	500	600	500	600	4, 000	4, 200	3, 500	5, 400	32. 23	66. 20	56. 25	22. 00
New York (L. I.)	3, 000	3, 090	3, 090	3, 020	24, 000	43, 300	27, 200	30, 800	15. 33	18. 41	23. 00	26. 25
Ohio (Wash. Co.)	600	850	850	750	3, 600	7, 600	8, 500	6, 600	37. 30	38. 25	16. 40	35. 30
Tennessee	1, 560	1, 750	2, 120	3, 000	7, 800	10, 500	12, 900	18, 000	27. 20	40. 88	14. 66	21. 65
Virginia (S. W.)	3, 660	2, 450	2, 200	2, 200	18, 300	17, 200	22, 000	14, 500	11. 86	17. 29	18. 02	37. 50
Washington	1, 240	1, 340	1, 340	1, 300	12, 400	13, 400	9, 400	11, 000	28. 25	60. 37	19. 00	11. 50
Total	21, 510	21, 880	23, 080	24, 000	144, 000	178, 500	166, 000	159, 100	22. 48	31. 15	20. 99	25. 07
Late:												
Colorado	3, 220	2, 600	3, 100	3, 300	43, 800	37, 700	44, 600	34, 000	7. 29	13. 90	12. 97	19. 94
Indiana	1, 990	1, 190	1, 510	1, 960	17, 500	11, 900	16, 200	15, 100	9. 10	16. 60	12. 78	25. 57
Michigan	2, 960	3, 120	3, 170	3, 320	23, 100	23, 100	27, 300	20, 900	9. 48	11. 68	12. 56	13. 59
Minnesota	3, 250	3, 070	2, 500	3, 500	31, 500	30, 400	26, 000	21, 700	8. 10	9. 27	14. 32	18. 01
New York, other	28, 560	33, 910	28, 130	29, 620	305, 600	417, 100	202, 500	251, 800	9. 95	5. 97	25. 56	17. 08
Ohio, other	2, 620	3, 510	3, 040	3, 330	23, 600	44, 200	25, 800	28, 000	7. 09	7. 54	11. 36	8. 75
Oregon	1, 710	950	950	1, 000	17, 800	9, 500	8, 100	5, 000	17. 31	18. 35	31. 25	27. 24
Pennsylvania	1, 740	1, 300	1, 400	1, 590	15, 800	15, 100	10, 600	13, 800	20. 19	20. 33	26. 60	18. 99
Utah	-------	-------	270	300	---------	---------	2, 700	3, 300	-----	-----	16. 00	18. 00
Wisconsin	13, 290	13, 500	13, 090	16, 360	127, 600	114, 800	138, 800	129, 200	9. 32	8. 98	15. 74	15. 78
Total	59, 340	63, 150	57, 160	64, 280	606, 300	703, 800	502, 600	522, 800	9. 86	7. 97	19. 36	16. 80
Grand total	129, 330	143, 790	137, 170	157, 220	1, 036, 500	1, 220, 700	984, 200	1, 069, 400	17. 84	15. 86	23. 53	19. 87

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Includes production used in the manufacture of sauerkraut.

TABLE 225.—*Cabbage for sauerkraut, commercial crop: Acreage, production, and price per ton, by States 1926–1929*

State	Acreage				Production				Price per unit of production			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	3,000	3,960	4,120	4,120	37,800	63,400	30,900	39,100	6.12	6.00	12.58	10.62
Ohio	1,850	2,590	2,250	2,700	20,400	33,700	19,600	23,200	6.00	7.50	7.08	7.15
Indiana	1,000	360	730	1,080	8,000	3,200	7,300	8,300	7.00	8.67	7.83	7.86
Illinois	360	360	670	670	2,900	4,000	6,200	5,000	7.56	8.27	12.40	15.10
Michigan	1,500	1,530	1,620	1,700	15,000	13,800	13,000	10,700	6.50	6.40	7.22	7.88
Wisconsin	1,790	2,090	2,650	3,020	16,100	20,100	27,300	24,200	6.47	6.56	8.68	9.36
Minnesota	420	430	430	500	4,400	5,200	4,600	4,000	5.00	6.25	7.00	7.35
Colorado	100	300	500	500	1,600	4,200	7,000	5,000	6.38	7.00	8.00	15.20
Washington	380	260	260	320	3,800	2,600	2,200	2,900	10.00	10.00	10.00	11.00
Other States	1,760	1,920	2,110	2,300	14,100	15,700	18,100	17,900	9.97	7.03	11.33	12.00
Total	12,160	13,800	15,340	16,910	124,100	165,900	136,200	140,300	6.80	6.70	9.60	9.87

Bureau of Agricultural Economics. Estimates based upon returns from kraut packers.

TABLE 226.—*Cabbage: Car-lot shipments, by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York [3]	9,511	9,315	10,274	9,086	11,816	12,545	12,898	14,080	8,588
Pennsylvania [3]	240	300	406	317	409	552	523	420	252
Ohio	524	318	589	538	658	414	544	765	582
Illinois	157	107	144	289	279	198	195	193	329
Michigan [3]	598	477	908	732	644	573	287	375	428
Wisconsin	4,766	2,908	5,875	6,415	4,955	5,409	5,177	4,547	6,145
Minnesota	895	592	1,192	989	1,552	873	1,125	1,009	1,493
Iowa	373	150	566	390	541	265	459	435	566
Maryland	219	325	448	220	509	238	166	293	266
Virginia	1,546	3,537	2,952	3,343	3,390	2,220	1,805	2,742	2,459
North Carolina	49	251	222	364	275	356	341	292	254
South Carolina	1,215	3,419	3,340	4,183	1,409	3,164	2,719	1,933	2,248
Florida [4]	4,581	1,617	2,998	1,172	3,842	1,936	1,667	1,051	1,168
Kentucky	112	103	73	85	107	45	17	24	33
Tennessee	136	181	563	270	348	317	609	667	823
Alabama	420	1,068	1,460	1,358	920	1,301	1,831	1,515	886
Mississippi	878	509	1,629	1,134	605	674	990	710	1,249
Louisiana	203	350	425	330	80	693	435	480	657
Texas [4]	5,180	1,847	4,049	1,356	7,281	4,048	6,093	5,546	7,242
Colorado	1,832	2,523	1,964	3,174	1,473	1,432	1,274	683	1,162
Washington	114	170	104	155	52	103	154	139	82
California	913	1,008	647	616	376	860	412	443	702
Other States	364	357	520	473	430	836	794	727	847
Total	34,826	31,432	41,348	36,989	41,951	39,052	40,515	39,069	38,461

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season covers 17 months; from December through the second following April; i. e., the 1920 season begins December, 1919, and ends April, 1921.

[2] Preliminary.

[3] Figures include shipments in May of succeeding crop year as follows: New York, 1922, 1 car, 1926, 3 cars, 1927, 25 cars, 1928, 1 car; Pennsylvania, 1920, 1 car; Michigan, 1927, 1 car, 1928, 2 cars.

[4] Figures include shipments in November of preceding crop year as follows: Florida, 1928, 5 cars; Texas, 1920, 2 cars, 1922, 4 cars, 1923, 22 cars, 1924, 9 cars, 1925, 12 cars, 1928, 30 cars.

TABLE 227.—*Cabbage, Danish: Monthly average l. c. l. price per ton*[1] *to jobbers Chicago and New York, 1918–1929*

Market, and season beginning October[2]	Chicago						New York					
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1918				28.00	29.58	41.72				27.73	27.07	42.36
1919	25.82	35.64	68.00	96.56	70.17			37.94	71.67	108.67	87.40	98.33
1920	11.15	11.09	14.15	18.25	14.07	14.10		18.64	15.21	18.67	14.50	16.06
1921	[3]41.85	[3]47.03	[3]52.43	44.20	36.60		39.23	41.52	49.50	52.00	40.40	42.20
1922		16.60	24.20	30.20	48.00	60.20	20.20	15.80	23.60	26.60	41.60	63.20
1923		17.00	22.60	33.20	32.00		26.60	20.20	27.20	33.20	39.40	48.80
1924			[4]30.20	[3]30.85	[3]28.00	[3]25.68	17.60	18.40	18.60	28.80	22.60	15.40
1925	[4]22.40	[4]40.00	42.25	54.87	53.50		23.16	29.24	37.54	56.09	60.66	56.35
1926	13.68	24.50	25.00	21.65			21.76	22.54	31.17	25.69	18.70	20.71
1927	19.80	19.40	19.40	17.80	16.20		18.42	15.32	14.90	15.31	[4]14.40	20.04
1928	25.60	35.60	46.40	56.80	43.20		41.46	36.90	43.88	50.32	46.41	
1929	27.00	24.18	35.69				30.20	28.98	34.75			

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa in order to obtain comparability.

[1] Unless otherwise stated, quotations are on bulk per ton sales.
[2] The season during which Danish cabbage prices are obtainable usually runs from October to March of the following year.
[3] Sacked per ton delivered.
[4] Converted from hundredweight price.

TABLE 228.—*Cantaloupes, commercial crop: Acreage, production, and price per crate, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per crate			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
Early:	*Acres*	*Acres*	*Acres*	*Acres*	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*1,000 crates*[1]	*Dollars*	*Dollars*	*Dollars*	*Dollars*
California (Imperial)	35,300	37,920	33,460	38,360	5,048	6,029	6,224	6,713	1.29	1.49	1.60	1.63
Florida	380	420	920	500	30	34	37	50	1.30	2.23	2.00	2.00
Georgia	700	710	650	600	70	57	52	48	1.38	.76	1.50	2.22
Texas (Lower V.)	350	180	100	100	35	21	11	15	1.00	1.54	1.20	2.00
Total	36,730	39,230	35,130	39,560	5,183	6,141	6,324	6,826	1.29	1.49	1.60	1.64
Intermediate:												
Arizona	7,000	10,000	10,000	11,500	1,400	1,900	1,800	2,024	1.32	1.46	1.34	1.25
Arkansas	7,310	5,410	6,170	3,890	439	406	580	300	1.36	2.19	1.02	1.22
California (other)	8,380	7,800	10,250	12,100	1,575	1,513	2,112	2,323	1.60	1.80	1.07	.99
Delaware	2,000	2,000	3,200	3,200	240	220	371	272	.90	1.25	1.00	1.50
Illinois	400	200	420	420	26	6	45	44	1.08	1.90	1.20	1.45
Indiana	4,340	4,380	4,640	4,180	490	504	524	418	1.41	1.92	1.23	1.50
Maryland	6,120	7,100	6,040	6,280	998	888	676	534	1.42	2.20	1.21	1.45
Nevada	160	100	250	100	20	19	50	22	1.18	1.00	.80	2.00
North Carolina	2,100	2,310	2,310	1,000	176	266	261	70	.88	.97	.98	1.20
Oklahoma	630	330	500	500	41	30	34	38	.80	1.00	.89	1.25
South Carolina	620	750	640	510	65	68	56	26	.72	.97	1.31	1.90
Texas (other)	2,030	2,030	1,610	2,230	162	152	145	165	1.91	.78	.50	1.16
Total	41,090	42,410	46,030	45,910	5,632	5,972	6,654	6,236	1.40	1.69	1.15	1.20
Late:												
Colorado	11,670	12,100	9,000	11,000	1,984	1,537	1,170	2,530	1.17	1.05	.94	.83
Iowa	1,120	1,130	780	580	134	120	78	39	1.50	1.00	1.06	1.48
Kansas	450	450	450	450	63	52	57	54	1.17	1.25	.92	.81
Michigan	1,280	1,220	1,830	1,600	134	168	137	224	1.30	1.23	1.35	1.35
Nevada	350	300	170	280	46	57	30	43	1.12	1.00	1.70	1.75
New Jersey	4,500	4,000	3,400	3,300	518	440	544	363	.65	.75	.95	1.88
New Mexico	2,600	2,500	1,400	1,700	442	250	189	212	1.06	1.00	1.10	1.00
Tennessee	600	480	470	250	39	32	33	20	1.15	1.35	1.05	1.50
Washington	1,300	1,960	2,000	2,100	218	245	200	252	1.28	2.12	.61	.76
Total	23,870	24,140	19,500	21,260	3,578	2,901	2,438	3,737	1.10	1.10	.97	.99
Grand total	101,690	105,780	100,660	106,730	14,393	15,014	15,416	16,799	1.29	1.49	1.30	1.33

Bureau of Agricultural Economics, estimates based upon returns from crop reporters.
[1] Standard crate.

TABLE 229.—*Cantaloupes:* [1] *Car-lot shipments, by State of origin, 1920–1929*

State	Crop movement season [2]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [3]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Indiana	632	644	894	681	822	1, 089	629	415	465	387
Michigan	209	232	465	306	114	146	84	77	52	16
Delaware	600	942	843	818	511	657	551	427	427	285
Maryland	781	1, 153	1, 233	1, 270	699	1, 116	1, 283	1, 159	1, 002	561
North Carolina	358	894	700	620	401	655	401	606	304	88
South Carolina	131	281	270	70	116	33	173	179	94	44
Georgia	387	619	1, 632	217	586	117	136	108	104	76
Arkansas	986	1, 554	1, 002	337	1, 052	1, 245	1, 127	788	854	418
Texas	169	156	186	387	456	498	514	242	244	176
Colorado	2, 482	3, 288	4, 420	2, 306	3, 229	3, 837	5, 108	3, 980	2, 789	4, 661
New Mexico	968	508	275	364	518	574	640	415	370	352
Arizona	1, 159	1, 504	1, 558	1, 208	2, 145	3, 833	3, 712	5, 217	5, 901	5, 457
Washington	380	208	371	207	298	221	145	252	258	363
California [4]	13, 251	13, 166	15, 304	16, 486	19, 930	18, 707	18, 320	22, 406	25, 307	26, 843
Other States	460	666	777	646	617	1, 091	601	486	523	261
Total	22, 953	25, 815	29, 930	25, 923	31, 494	33, 819	33, 424	36, 757	38, 694	39, 988

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Includes honeydews and other miscellaneous melons not separately reported until 1923. The shipments of melons, other than cantaloupes, amounted in 1923 to 1,152 cars; in 1924 to 2,565; in 1925 to 3,654; in 1926 to 6,484; in 1927 to 6,516; in 1928 to 9,719; and in 1929 to 11,807.
[2] Crop-movement season extends from Apr. 1 through November of a given year.
[3] Preliminary.
[4] Figures for California include shipments in December as follows: 1920, 1 car; 1925, 18 cars; 1926, 3 cars; 1927, 4 cars; 1928, 2 cars.

TABLE 230.—*Carrots, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall: California	640	860	1, 840	2, 900	344	458	861	1, 595	0. 72	0. 79	0. 34	0. 70
Early: Texas	3, 920	4, 340	6, 450	7, 540	1, 047	998	1, 354	1, 885	. 32	. 43	. 48	. 31
Second early:												
California	1, 160	2, 190	3, 020	6, 430	623	1, 064	1, 540	[1] 3, 112	. 72	. 68	. 93	. 62
Louisiana	7, 330	11, 600	8, 010	6, 220	1, 261	2, 448	1, 370	1, 051	. 70	. 51	. 51	. 62
Mississippi	1, 500	2, 040	1, 750	1, 000	300	551	413	185	1. 23	. 56	. 33	. 71
Total	9, 990	15, 830	12, 780	13, 650	2, 184	4, 063	3, 323	4, 348	. 78	. 56	. 68	. 58
Intermediate:												
New Jersey	1, 400	1, 400	1, 900	1, 900	350	336	380	437	1. 00	. 92	1. 18	1. 10
North Carolina		680	450	400		136	90	70		. 55	. 48	. 60
Virginia		250	540	550		75	135	124		. 80	. 75	. 85
Total	1, 400	2, 330	2, 890	2, 850	350	547	605	631	1. 00	. 81	. 98	1. 00
Late:												
Colorado			600	850			144	238			. 90	. 45
Illinois	800	800	800	500	352	356	352	230	. 75	. 66	. 90	. 50
Minnesota			60	80			29	53			. 60	. 52
New York	2, 250	2, 140	2, 120	2, 200	1, 246	1, 338	856	1, 181	. 51	. 46	1. 00	. 64
Total	3, 050	2, 940	3, 580	3, 630	1, 598	1, 694	1, 381	1, 702	. 56	. 50	. 96	. 62
Grand total	19, 000	26, 300	27, 540	30, 570	5, 523	7, 760	7, 524	10, 161	. 64	. 56	. 68	. 58

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Includes 300,000 bushels not harvested.

TABLE 231.—*Carrots: Car-lot shipments by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,158	1,247	1,523	1,410	2,262	1,825	1,845	2,430	1,484
New Jersey	32	32	26	34	18	48	44	85	67
Illinois	53	62	82	24	3	23	2	13	96
Michigan	11	33	25	35	55	54	77	91	208
Virginia	3	1	10	2	1	40	10	44	137
Mississippi	77	81	304	142	266	197	209	496	230
Louisiana	28	43	62	58	32	106	70	177	99
Texas	5	198	48	65	282	575	1,136	903	1,685
Colorado	1	9	4	12	26	29	62	10	216
California	111	19	21	24	157	278	557	2,363	2,938
Other States	123	115	151	173	212	252	290	241	295
Total	1,602	1,840	2,256	1,979	3,314	3,427	4,302	6,853	7,455

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season begins in October of the previous year in such early shipping States as California, Texas, and Louisiana and extends through June of the following year in order to include shipments from storage in Northern States and to have totals comparable with acreage and production figures.

TABLE 232.—*Cauliflower, commercial, crop: Acreage, production, and price per crate, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per crate			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates*	*1,000 crates*	*1,000 crates*	*1,000 crates*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
California (spring) [1]	10,500	8,950	12,800	14,000	3,224	2,452	3,558	4,186	0.88	1.00	0.84	0.69
Oregon	4,000	1,450	940	1,000	624	177	146	70	.45	1.05	1.40	1.00
Total	14,500	10,400	13,740	15,000	3,848	2,629	3,704	4,256	.81	1.00	.86	.70
Late:												
Colorado	1,100	1,160	1,700	3,600	99	336	510	1,296	1.15	1.78	1.20	.70
New Jersey	300	300	200	250	44	45	26	38	1.15	1.50	1.50	1.75
New York	5,560	5,060	4,620	5,330	1,334	794	545	602	1.36	1.83	1.64	1.51
Oregon (fall)	650	920	900	900	244	320	202	207	1.49	1.10	1.00	1.00
Utah	60	180	270	280	12	49	44	51	2.00	2.00	1.60	1.40
Total	7,670	7,620	7,690	10,360	1,733	1,544	1,327	2,194	1.37	1.66	1.37	.98
Grand total	22,170	18,020	21,430	25,360	5,581	4,173	5,031	6,450	.98	1.25	1.00	.79

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Season in California begins in October of the previous year.

TABLE 233.—*Cauliflower: Car-lot shipments, by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	781	567	683	653	734	834	1,019	696	574
Colorado [3]		3	4	101	61	191	220	411	843
Oregon	76	134	282	374	109	1,246	780	559	501
California [4]	2,957	3,640	3,613	3,034	3,408	4,353	4,730	7,040	7,535
Other States	39	30	35	121	146	[5] 100	[6] 143	[7] 340	447
Total	3,853	4,374	4,617	4,283	4,458	6,724	6,892	9,046	9,900

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season extends from July 1 through June of the following year.
[2] Preliminary.
[3] Totals include figures in June of preceding crop year as follows: 1925, 1 car; 1928, 1 car.
[4] Totals include figures in succeeding crop year as follows: 1921, 4 cars in August and 7 in September; 1922, 7 cars in July, 5 in August, and 8 in September; 1924, 4 cars in July; 1927, 1 car in July.
[5] Includes 2 cars in July, 1926, from Virginia.
[6] Includes 1 car in May and 6 in June, 1926, from Washington.
[7] Includes 12 cars in June, 1927, from Washington.

TABLE 234.—*Celery, commercial crop: Acreage, production, and price per crate, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per crate			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
California [2]	6,250	8,550	9,050	8,850	1,369	2,078	1,810	2,602	1.49	1.82	1.54	1.54
Florida	3,520	4,240	5,380	6,500	1,320	1,908	2,206	2,340	3.00	2.08	2.83	2.15
Total	9,770	12,790	14,430	15,350	2,689	3,986	4,016	4,942	2.23	1.94	2.25	1.83
Late:												
Colorado	940	940	900	1,050	282	282	270	252	1.22	1.70	1.65	1.10
Idaho			60	130			47	102			1.35	1.34
Michigan	3,720	3,760	3,990	4,150	521	846	1,237	1,303	1.92	1.38	1.22	1.42
New Jersey	1,350	1,300	1,320	1,130	417	370	244	241	1.09	.82	1.05	1.58
New York	4,890	4,620	4,590	5,100	1,506	1,714	1,299	1,362	1.50	1.20	1.75	1.46
Ohio	540	450	520	540	120	128	139	137	1.68	2.43	2.05	1.50
Oregon	360	410	410	450	144	178	154	162	1.83	1.81	1.48	1.65
Pennsylvania	260	280	270	230	88	81	71	61	1.46	1.42	1.83	1.67
Utah			550	600			147	124			1.00	1.00
Total	12,060	11,760	12,610	13,380	3,078	3,599	3,608	3,744	1.51	1.32	1.48	1.42
Grand total	21,830	24,550	27,040	28,730	5,767	7,585	7,624	8,686	1.85	1.65	1.88	1.65

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] New York crate (two-thirds size)
[2] Season in California begins in fall of previous year.

TABLE 235.—*Celery: Car-lot shipments, by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	3,110	3,047	3,247	3,742	4,529	4,492	4,898	5,907	4,192
New Jersey	94	219	115	219	177	149	138	106	32
Pennsylvania	186	224	212	223	225	208	194	169	71
Ohio	46	67	76	55	64	71	51	63	54
Michigan	954	1,031	1,626	1,486	1,332	2,224	1,880	1,996	2,137
Florida	2,652	4,218	4,954	6,398	7,219	7,952	5,504	7,499	8,413
Colorado	305	211	222	125	197	399	211	161	188
Oregon	16	53	82	205	363	398	511	625	605
California	3,472	2,617	4,334	4,631	4,240	5,953	7,565	7,837	[3] 9,569
Other States	24	19	52	76	83	67	48	108	202
Total	10,859	11,706	14,920	17,160	18,429	21,913	21,000	24,471	25,463

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the Bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season covers 19 months, from December through the second following June; i. e., the 1920 season begins December, 1919, and ends June, 1921.
[2] Preliminary.
[3] Includes 1 car in July 1929.

TABLE 236.—*Corn, sweet, for canning, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

State	Acreage				Production				Price per ton			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	14,650	8,260	10,770	14,850	46,900	23,100	30,200	46,000	28.72	22.30	24.70	24.70
New Hampshire	1,050	780	1,110	1,320	2,400	1,800	2,600	3,300	23.65	21.60	23.70	23.80
Vermont	2,290	1,870	1,940	2,370	5,000	2,400	4,700	6,200	21.30	19.10	18.30	18.20
New York	27,420	20,290	27,000	24,600	60,300	32,500	32,400	36,900	18.24	18.80	16.50	17.00
Pennsylvania	4,840	2,800	4,140	4,470	9,700	3,600	4,100	4,500	13.00	12.00	13.80	15.00
Ohio	26,380	18,730	27,910	27,700	71,200	30,000	39,100	52,600	10.14	10.00	10.80	11.20
Indiana	30,380	17,010	27,390	28,200	88,100	23,800	38,300	33,800	10.18	10.41	13.00	13.00
Illinois	58,280	40,650	58,300	62,220	145,700	81,300	128,300	124,400	14.23	11.06	12.70	12.80
Michigan	11,080	9,400	8,930	8,220	22,200	14,100	16,100	8,200	12.54	12.98	12.40	12.50
Wisconsin	17,350	10,410	14,780	14,780	29,500	13,500	29,600	32,500	11.81	10.66	11.50	11.80
Minnesota	24,450	26,420	33,000	43,900	73,400	50,200	85,800	101,000	9.93	10.00	10.80	11.00
Iowa	50,480	26,750	39,860	43,450	151,400	61,500	99,600	108,600	10.35	8.96	9.30	9.90
Nebraska	6,970	4,600	5,470	5,740	18,800	11,500	9,800	10,900	10.07	8.32	9.40	10.00
Delaware	3,000	3,500	4,060	3,900	7,200	8,400	7,300	5,800	13.35	10.60	12.00	13.00
Maryland	33,850	27,500	35,500	38,700	74,500	49,500	53,200	50,300	14.08	11.78	14.00	15.00
Tennessee	(1)	(1)	3,100	3,400	(1)	(1)	5,300	6,800	(1)	(1)	13.00	13.00
Other States	4,840	4,380	2,700	3,250	9,700	7,000	6,500	7,500	12.00	13.40	11.50	12.00
Total	317,310	223,350	305,960	331,070	816,000	414,200	592,900	639,300	13.23	11.96	12.64	13.19

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

[1] Included in Other States prior to 1928.

TABLE 237.—*Corn, canned: Pack* [1] *in the United States, 1917–1929*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Maine	567	1,113	1,652	1,588	911	1,066	923	1,294	1,693	1,347	806	966	1,521
New York	257	489	1,014	829	564	616	434	749	1,311	1,038	676	666	782
Ohio	1,200	1,584	1,360	1,544	850	1,073	1,390	787	2,375	1,735	846	1,138	1,551
Indiana	742	513	586	861	709	665	1,208	846	2,223	2,044	703	1,131	1,250
Illinois	2,422	2,199	2,225	2,271	1,711	1,939	2,833	2,310	4,030	3,053	1,961	3,017	3,153
Wisconsin	166	373	635	590	576	625	648	388	1,148	843	310	578	547
Minnesota	202	309	456	643	573	598	898	1,199	1,541	1,762	1,088	1,648	2,604
Iowa	2,280	2,300	2,196	3,246	1,190	1,959	2,382	1,764	4,105	3,361	1,377	2,541	2,908
Maryland	2,002	2,033	2,081	2,217	1,130	1,944	2,256	1,707	3,678	2,133	1,493	1,648	1,865
Other States	965	809	1,045	1,251	629	934	1,134	1,087	2,216	1,753	1,087	1,164	1,306
United States	10,803	11,722	13,550	15,040	8,843	11,419	14,106	12,131	24,320	19,069	10,347	14,497	17,487

Bureau of Agricultural Economics. Compiled from National Canners' Association data, 1917-1926; Census of Manufactures, 1927–1928; 1929, The American Grocer, Dec. 18, 1929.

[1] Stated in cases of 24 No. 2 cans.

TABLE 238.—*Cucumbers for consumption, fresh, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall: Florida	980	280	860	980	143	38	69	75	2.51	1.92	2.75	3.60
Early:												
Alabama	2,880	3,830	2,680	2,550	472	582	364	581	.56	.97	1.01	1.20
California	1,200	1,000	1,050	1,000	173	163	181	159	.93	.97	1.06	1.19
Florida	6,610	7,440	8,560	10,080	965	1,042	685	1,028	2.51	1.92	3.04	2.66
Georgia	720	720	720	709	67	90	45	62	.85	1.26	1.18	1.93
Louisiana	3,010	2,760	2,360	3,000	316	317	189	408	1.59	.79	1.25	1.31
South Carolina	4,120	4,300	5,300	5,140	490	636	398	586	1.02	1.37	.71	.97
Texas	3,000	4,150	5,220	5,680	357	415	360	636	1.55	1.05	1.69	1.86
Total	21,570	24,200	25,890	28,150	2,840	3,245	2,222	3,460	1.57	1.35	1.72	1.74
Second early:												
Arkansas	1,760	1,760	1,970	1,480	150	176	177	152	1.01	1.51	.63	1.27
North Carolina	4,570	4,340	4,340	4,200	530	764	573	525	1.13	.90	.72	1.76
Virginia	1,640	1,650	1,730	1,470	205	214	164	103	1.15	.91	1.00	2.75
Total	7,970	7,750	8,040	7,150	885	1,154	914	780	1.12	1.00	.75	1.79
Intermediate:												
Delaware	1,500	1,120	1,210	1,150	255	202	157	132	.56	.90	.40	1.37
Illinois	560	560	590	650	67	28	41	49	.78	1.21	.71	1.97
Maryland	2,080	1,700	1,750	1,780	260	292	315	303	.56	1.30	.53	1.38
New Jersey	2,100	2,000	2,040	2,240	420	370	357	325	.95	1.25	1.00	1.45
Ohio, Washington Co.			110	100			6	5			.95	1.00
Total	6,240	5,380	5,700	5,920	1,002	892	876	814	.74	1.19	.71	1.44
Late: New York	3,950	3,950	4,110	4,110	490	585	600	300	.94	.98	1.06	1.59
Grand total	40,710	41,560	44,600	46,310	5,360	5,914	4,681	5,429	1.31	1.22	1.27	1.72

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 239.—*Cucumbers for pickles, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Price per unit of production			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	920	680	800	820	32	35	44	28	0.88	1.27	0.93	0.93
Ohio	1,600	1,750	1,700	1,730	88	61	110	78	.90	1.02	1.00	1.06
Indiana	7,250	6,800	9,870	9,480	392	258	572	332	1.12	.93	.87	.90
Illinois	940	960	1,560	1,250	47	34	90	44	1.22	1.24	1.10	1.10
Michigan	25,030	17,350	22,840	21,000	1,051	520	1,256	630	.98	.90	.88	.90
Wisconsin	11,950	6,800	10,190	11,310	598	272	550	475	.92	1.08	.98	1.00
Minnesota	3,000	3,060	3,500	3,500	135	92	105	84	.90	.73	.93	.95
Iowa	800	270	940	1,300	34	12	62	62	1.11	.90	1.03	1.05
Missouri	2,800	670	1,260	1,260	98	35	76	28	.82	1.00	.75	.75
Colorado	2,900	3,130	2,300	2,400	177	156	232	276	.87	.75	.60	.60
Washington	530	410	460	510	32	28	44	77	.90	.82	.75	.75
California	2,560	2,120	2,760	2,710	369	337	486	623	.93	.97	.62	.63
Other States	9,460	7,940	7,240	7,960	615	540	348	478	.92	.96	.90	.90
Total	69,740	51,940	65,420	65,230	3,668	2,380	3,975	3,215	.96	.94	.85	.84

Bureau of Agricultural Economics. Estimates based upon returns from pickle packers.

TABLE 240.—*Cucumbers: Car-lot shipments, by State of origin, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1926	1928	1929 [1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	312	540	395	383	694	686	456	607	1,001	528
New Jersey	287	271	164	258	276	481	261	368	370	156
Ohio	52	118	124	68	111	91	187	203	191	119
Indiana	9	25	18	6	16	57	104	135	147	125
Illinois	142	164	68	15	77	245	150	101	148	117
Delaware	256	137	191	225	240	302	304	366	214	163
Maryland	297	343	368	446	311	598	479	692	563	469
Virginia	83	19	221	84	387	448	200	339	229	179
North Carolina	408	641	687	1,175	1,639	1,562	869	935	812	651
South Carolina	525	664	887	720	918	794	687	916	663	1,043
Florida	835	1,414	2,034	1,647	1,381	1,963	2,048	2,300	1,572	2,268
Alabama	259	109	702	367	576	706	684	583	606	795
Texas	95	64	119	46	147	72	316	178	382	294
Arkansas	26	62	8	24	93	145	234	228	328	195
Other States	103	261	363	236	316	342	293	229	242	354
Total	3,689	4,832	6,349	5,700	7,182	8,492	7,272	8,180	7,468	7,456

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.

TABLE 241.—*Eggplant, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall:												
Florida	490	150	620	660	180	46	136	132	1.35	1.61	0.91	2.00
Texas	180	370	300	250	41	111	90	10	1.00	.45	.59	1.60
Total	670	520	920	910	221	157	226	142	1.29	.79	.78	1.97
Early: Florida	530	580	930	920	212	188	236	188	1.33	1.21	.91	1.34
Second early: Louisiana	1,060	890	830	800	138	139	132	123	1.05	1.00	.90	1.30
Intermediate: New Jersey	1,000	1,100	1,210	1,300	220	330	302	260	1.00	.80	.88	.75
Grand total	3,260	3,090	3,890	3,630	791	814	896	713	1.18	.93	.87	1.24

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 242.—*Lettuce, commercial crop: Acreage, production, and price per crate, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per crate			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*1,000 crates* [1]	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
Arizona	6,500	7,000	12,700	16,500	1,462	1,281	1,664	1,766	1.85	0.97	0.98	1.60
California (Imperial)	28,000	34,400	22,000	27,250	4,900	5,229	3,740	4,006	1.95	1.34	1.62	2.09
Florida	1,500	1,840	1,850	1,970	252	294	314	362	2.21	1.62	1.61	1.29
Texas	640	950	1,000	1,100	72	103	100	220	1.19	1.00	1.02	1.00
Total	36,640	44,190	37,550	46,820	6,686	6,907	5,818	6,354	1.93	.96	1.43	1.87
Second early:												
Arizona	2,000	7,800	13,500	11,000	450	1,755	1,418	1,727	2.05	1.63	1.88	2.85
California (other)	17,800	16,530	24,500	26,150	3,204	2,314	3,479	2,693	1.28	.96	1.39	1.86
North Carolina	1,420	1,490	1,490	1,160	379	207	238	197	2.00	1.87	1.60	1.65
South Carolina	780	700	750	680	133	158	112	102	1.81	1.59	2.11	1.83
Total	22,000	26,520	40,240	38,990	4,166	4,434	5,247	4,719	1.45	1.29	1.55	2.21
Intermediate:												
Idaho	200	120	40	50	25	18	4	8	1.47	1.22	1.67	2.25
New Jersey	1,100	1,200	1,300	1,170	275	300	292	234	1.00	2.34	1.70	1.76
New Mexico	30	20	200	------	2	2	16	------	1.66	.75	1.25	------
Oregon	260	200	50	70	13	10	7	6	1.42	1.25	1.25	1.30
Virginia	300	300	300	280	38	50	60	57	1.70	1.50	1.45	1.00
Washington	1,510	1,940	1,760	2,390	317	388	370	514	1.30	1.49	1.00	1.27
Total	3,400	3,780	3,650	3,960	670	768	749	819	1.20	1.81	1.32	1.40
Late:												
California (other)	------	5,260	7,800	9,630	------	773	975	1,194	------	.97	2.16	2.12
Colorado	13,240	13,240	9,800	9,800	1,523	1,456	1,127	1,078	1.43	1.63	1.07	1.25
New Mexico	950	340	200	200	71	49	13	20	1.66	.75	1.50	1.30
New York	7,200	5,540	4,460	5,800	1,246	1,457	1,004	1,740	1.60	1.48	2.68	1.13
Pennsylvania	80	80	80	80	12	10	9	12	1.24	1.50	2.70	1.20
Total	21,470	24,460	22,340	25,510	2,852	3,745	3,128	4,044	1.51	1.42	1.93	1.46
Late (Fall):												
California (other)	19,300	21,350	19,120	24,500	2,355	2,946	3,174	4,067	1.56	.77	2.24	1.74
Idaho	1,000	1,000	260	260	132	200	38	38	1.26	.85	1.67	.75
New Jersey	1,300	1,250	1,000	950	228	312	150	204	1.20	1.76	2.26	2.20
New Mexico	50	50	30	------	4	8	1	------	1.66	.75	1.65	------
Oregon	100	100	50	50	5	5	4	5	1.75	1.25	1.25	1.30
Washington	90	110	350	350	19	22	70	72	1.30	1.48	1.25	1.50
Wyoming	210	200	40	40	27	22	3	3	1.40	1.20	1.82	1.30
Total	22,050	24,060	20,850	26,150	2,770	3,515	3,440	4,389	1.51	.87	2.21	1.75
Grand total	105,560	123,010	124,630	141,430	17,144	19,369	18,382	20,325	1.65	1.13	1.69	1.82

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Western crate normally containing 4 dozen heads; other crates reduced to this equivalent.

TABLE 243.—*Lettuce: Car-lot shipments, by State of origin, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,775	3,240	3,167	3,817	3,698	3,821	3,019	3,496	3,140	3,704
New Jersey	208	469	571	456	417	463	303	308	144	166
North Carolina	207	445	622	718	714	537	540	447	477	362
South Carolina	121	716	987	577	423	736	372	369	241	310
Florida	2,940	2,267	3,323	3,146	2,257	1,519	987	929	819	910
Idaho	25	180	889	1,241	532	501	398	196	72	76
Colorado	129	234	812	1,436	1,036	3,096	2,795	2,848	2,368	2,098
Arizona	254	168	678	1,108	2,049	3,519	4,906	9,131	9,228	7,853
Washington	354	635	812	1,081	674	820	904	1,151	1,240	1,737
California	7,358	9,850	9,744	15,113	18,480	21,618	27,443	27,574	33,457	35,671
Other States	417	534	635	792	655	676	540	401	318	277
Total	13,788	18,738	22,240	29,485	30,935	37,306	42,207	46,850	51,504	53,164

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.

TABLE 244.—*Onions, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early (Bermuda, Creole):												
California	2, 850	3, 950	3, 950	3, 450	926	1, 118	980	869	1. 39	1. 80	0. 77	1. 25
Louisiana	2, 750	2, 900	2, 310	2, 180	352	316	293	277	1. 17	1. 22	. 89	1. 09
Texas	12, 510	11, 220	18, 280	19, 700	2, 552	2, 199	3, 546	3, 763	1. 36	1. 69	1. 10	1. 02
Total	18, 110	18, 070	24, 540	25, 330	3, 830	3, 633	4, 819	4, 909	1. 35	1. 68	1. 02	1. 06
Intermediate (domestic):												
California	320	550	780	840	143	228	299	373	. 60	. 74	. 75	. 45
Iowa (Scott Co. Dist.)	780	800	1, 000	1, 000	246	206	288	375	. 94	1. 35	. 88	. 86
Kentucky	1, 000	800	800	600	250	110	320	48	. 50	1. 00	. 45	. 43
New Jersey	2, 900	2, 900	3, 000	2, 550	580	696	780	650	1. 00	1. 25	1. 00	1. 35
Texas (Collin Co. Dist.)	1, 500	1, 050	2, 000	660	262	131	760	170	. 84	1. 89	. 56	1. 27
Virginia	900	600	400	250	90	89	64	62	. 76	. 75	. 51	1. 15
Washington (Walla Walla Co.)	1, 000	1, 000	1, 000	1, 030	400	418	415	525	. 68	. 63	. 40	. 63
Total	8, 400	7, 700	8, 980	6, 930	1, 971	1, 878	2, 926	2, 203	. 80	1. 07	. 69	. 91
Late (domestic):												
California	7, 260	5, 170	5, 160	5, 750	2, 076	1, 872	1, 533	1, 587	. 65	. 70	1. 28	. 85
Colorado	3, 700	4, 300	3, 760	7, 000	1, 018	1, 376	1, 241	2, 583	. 50	. 45	1. 42	. 45
Idaho	950	1, 900	1, 000	1, 100	276	902	700	522	. 48	. 47	1. 14	. 50
Illinois	670	670	740	770	168	201	169	192	. 98	. 87	1. 22	. 70
Indiana	8, 440	8, 100	8, 510	8, 400	2, 726	2, 738	2, 042	2, 436	. 56	. 59	1. 60	. 56
Iowa (other)	1, 600	1, 470	1, 280	1, 420	480	400	421	469	. 46	. 67	1. 15	. 60
Massachusetts	4, 420	4, 550	3, 500	2, 730	1, 746	1, 342	840	1, 051	. 62	. 74	1. 01	. 85
Michigan	3, 370	3, 200	4, 520	5, 000	1, 284	1, 360	1, 243	1, 780	. 63	. 54	1. 40	. 62
Minnesota	1, 870	2, 180	1, 740	2, 160	527	691	632	756	. 54	. 51	1. 28	. 60
New York	7, 580	8, 530	5, 830	7, 810	2, 729	3, 352	1, 283	3, 577	. 67	. 59	1. 35	. 75
Ohio	5, 300	7, 000	6, 550	7, 860	1, 367	2, 352	891	2, 138	. 65	. 60	1. 60	. 55
Oregon	1, 130	1, 200	950	1, 040	358	420	361	406	. 51	. 58	1. 43	. 60
Pennsylvania	180	180	150	140	50	54	37	43	95	. 75	1. 10	. 71
Utah	800	900	1, 000	1, 100	360	360	520	475	. 60	. 50	1. 20	. 60
Washington (other)	800	860	710	820	260	359	411	377	. 38	. 57	1. 12	. 53
Wisconsin	1, 200	1, 600	1, 100	1, 210	348	507	385	363	. 51	. 58	1. 25	. 69
Total	49, 270	51, 810	46, 500	54, 310	15, 773	18, 286	12, 709	18, 755	. 60	. 58	1. 35	. 63
Total domestic	57, 670	59, 510	55, 480	61, 240	17, 744	20, 164	15, 635	20, 958	. 63	. 63	1. 23	. 66
Grand total	75, 780	77, 580	80, 020	86, 570	21, 574	23, 797	20, 452	25, 867	. 75	. 79	1. 18	. 74

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 245.—*Onions: Car-lot shipments, by State of origin, 1920–1928*

State	Crop-movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Massachusetts	3, 914	2, 244	1, 912	2, 454	2, 481	2, 856	3, 586	2, 495	1, 416
New York	3, 384	2, 890	2, 812	5, 505	5, 335	5, 109	3, 720	4, 101	1, 807
New Jersey	371	429	479	335	403	235	253	295	333
Ohio	3, 239	1, 749	4, 493	2, 714	4, 492	1, 856	2, 287	4, 070	1, 771
Indiana	4, 124	1, 972	4, 684	4, 610	3, 735	4, 158	4, 493	5, 000	3, 940
Illinois	409	251	487	378	241	291	158	142	180
Michigan	939	417	1, 867	1, 222	1, 623	1, 402	2, 171	2, 653	2, 662
Wisconsin	409	90	330	273	212	361	270	279	292
Minnesota	287	169	500	189	487	674	684	1, 289	1, 077
Iowa	830	416	927	882	1, 176	1, 365	1, 434	1, 333	1, 430
Virginia	139	280	371	274	345	138	178	131	178
Kentucky	304	382	258	263	266	152	134	145	69
Texas	4, 957	4, 209	4, 630	3, 027	3, 918	3, 941	5, 316	4, 028	7, 081
Idaho	28	50	161	256	322	876	531	891	1, 152
Colorado	150	447	651	928	1, 064	1, 809	1, 758	1, 460	2, 244
Utah	9	54	170	177	216	599	662	654	1, 029
Washington	810	702	765	1, 126	1, 016	1, 000	1, 200	1, 302	1, 153
Oregon	27	343	263	392	558	681	678	671	663
California	4, 802	3, 542	3, 631	4, 145	2, 671	3, 603	3, 013	3, 753	4, 492
Other States	340	254	369	330	235	540	536	499	351
Total	29, 472	20, 890	29, 760	29, 480	30, 796	31, 646	33, 062	35, 191	33, 320

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from March 1 of one year through June of the following year.
[2] Preliminary.

TABLE 246.—*Onions: United States imports, by countries, annual, 1920–1929*

Year ended June 30	Netherlands	Spain	Italy	United Kingdom	Canada	Canary Islands	Bermuda	Mexico	Chile	Australia	Egypt	Other countries	Total
	1,000 bush.	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*
1920	0	1,497	19	48	4	25	66	1	0	23	194	7	1,884
1921	2	575	8	43	8	14	28	(1)	0	3	6	2	689
1922	40	1,522	74	247	66	18	34	26	43	119	243	56	2,488
1923	33	990	11	157	42	13	18	20	1	3	447	48	1,783
1924	(1)	1,098	17	52	1	8	9	29	30	4	148	10	1,406
1925	60	1,090	19	71	29	7	9	18	79	8	618	67	2,075
1926	11	1,342	100	36	11	4	9	20	26	3	599	33	2,194
1927	48	1,084	65	59	9	2	9	1	76	8	912	25	2,298
1928	11	701	35	12	2	1	3	(1)	213	3	392	26	1,399
1929	580	1,007	145	26	4	2	(1)	11	134	4	105	32	2,050

Bureau of Agricultural Economics. Compiled from official records of the Bureau of Foreign and Domestic Commerce, Department of Commerce.

[1] Less than 500 bushels.

TABLE 247.—*Onions: Average l. c. l. price per 100 pounds to jobbers, at New York and Chicago, 1919–1929*

Market, and season beginning August	Various common varieties								Bermudas					
									April		May [2]		June [2]	
	Aug.[1]	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Yellow	Crystal white wax	Yellow	Crystal white wax	Yellow	Crystal white wax
New York:	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1919	3.32	3.39	3.46	4.42	5.70	6.24	5.69	5.92			5.92	5.56	2.53	2.25
1920	2.53	2.24	1.56	1.55	1.23	1.31	.98	.80	4.34	3.46	3.15	3.79	2.93	3.01
1921	2.80	3.43	5.06	5.63	5.45	7.34	8.25	8.21	7.66	6.20	4.14	3.79	3.91	3.54
1922	2.08	1.52	1.72	2.00	2.99	2.83	2.45	2.98			5.31	5.19		
1923	2.68	3.21	3.26	2.75	2.76	2.73	2.33	2.20			3.27			
1924	2.17	1.89	1.84	2.08	2.84	3.05	3.05	2.86	4.19	5.04	6.16	5.01	7.18	
1925	2.94	2.36	2.86	2.80	3.26	2.95	2.69	2.81			4.37		3.27	
1926	2.26	1.59	1.82	1.92	2.74	3.08	2.76	3.46	5.36		5.64		6.64	
1927	2.17	1.72	1.60	1.72	2.18	2.60	2.89	4.25	5.38	6.17	3.14	3.33	2.37	2.00
1928	2.62	3.53	3.62	4.14	4.42	4.88	5.42	4.67	4.47		3.10		3.50	
1929	2.31	2.02	1.91	1.86	2.28									
Chicago:														
1919	3.45	3.42	3.91	4.59	5.18	5.56	5.03	5.75	9.03		4.59	5.08	2.83	2.41
1920	2.06	1.94	1.59	1.56	1.31	1.16	.98	.93	3.48	4.37	2.79	3.73	2.53	3.27
1921	2.58	3.61	4.47	5.11	5.62	7.09	7.64	8.53	6.21	6.47	4.05	4.20	3.43	3.89
1922	2.12	1.61	1.70	2.22	2.29	2.56	3.44	3.38	5.96		5.15	5.79		
1923	3.19	3.48	3.29	3.22	3.07	3.27	3.04	2.79	5.17		3.37	4.10		
1924	3.11	2.73	2.43	2.52	2.88	3.96	4.38	4.32	4.15	5.46	6.33	6.75	7.94	8.39
1925	3.41	2.90	3.11	3.35	3.46	3.20	2.81	3.18	5.60	5.92	3.97	4.71	3.21	3.61
1926	2.25	2.07	1.92	1.69	2.46	3.31	3.42	3.92	5.27	5.96	5.66	6.15	5.57	6.07
1927	2.57	1.74	1.68	1.65	2.02	2.77	2.78	4.04	4.57	5.23	3.04	3.17	2.31	2.64
1928	2.72	3.35	3.66	4.22	4.59	5.27	5.39	5.26	4.07	5.22	3.06	3.33	3.45	4.42
1929	3.08	2.44	2.12	2.20	2.29									

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

Average prices as shown are based on stock of U. S. No. 1 grade; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa, in order to obtain comparability.

[1] Quotations began Aug. 23, 1920; Aug. 22, 1921; Aug. 7, 1922; Aug. 22, 1924; July 22, 1925.

[2] Last reported quotations of season June 30, 1920; June 11, 1921; June 14, 1922; May 29, 1923; June 4, 1924; June 10, 1925; for subsequent years onion reports have run through the entire year.

TABLE 248.—*Peas, green, for consumption fresh; commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
Arizona	400	500	500	600	11	25	50	36	1. 56	1. 33	2. 00	1. 68
California (Imperial)	1, 000	1, 700	3, 000	4, 400	100	85	240	242	2. 36	2. 20	3. 00	2. 52
Florida	760	700	1, 230	1, 320	40	34	68	59	2. 67	3. 50	2. 50	2. 80
Total	2, 160	2, 900	4, 730	6, 320	151	144	358	337	2. 38	2. 35	2. 76	2. 48
Second Early:												
California (other)	9, 650	16, 300	13, 560	14, 350	482	1, 744	1, 451	1, 622	3. 60	2. 00	1. 75	1. 68
Louisiana	760	1, 600	1, 330	1, 430	37	78	77	79	1. 94	1. 67	1. 68	2. 38
Mississippi	2, 050	2, 250	2, 200	2, 310	195	169	156	171	1. 81	1. 58	1. 78	1. 38
South Carolina	1, 700	2, 200	3, 100	2, 880	95	99	183	181	1. 26	1. 09	1. 50	1. 64
Total	14, 160	22, 350	20, 190	20. 970	809	2, 090	1, 867	2, 053	2. 82	1. 91	1. 72	1. 68
Intermediate:												
Delaware	60	80	80	100	4	7	6	7	2. 25	2. 00	1. 75	1. 00
Maryland	450	450	800	820	27	35	51	62	1. 19	1. 32	1. 12	1. 25
New Jersey	3, 800	4, 000	3, 000	3, 000	323	360	240	240	2. 20	2. 13	1. 40	1. 30
North Carolina	3, 880	3, 960	4, 390	3, 100	213	277	351	217	1. 32	1. 92	. 82	1. 61
Tennessee	500	500	500	350	25	28	35	21	1. 87	2. 17	1. 00	1. 25
Utah	200	200	600	600	30	16	67	68	1. 95	2. 40	1. 50	1. 50
Virginia	2, 440	3, 000	3, 000	2, 000	117	291	273	166	. 93	1. 57	1. 02	2. 35
Total	11, 330	12, 190	12, 370	9, 970	739	1, 014	1, 023	781	1. 69	1. 89	1. 08	1. 62
Late:												
California—												
Imperial	3, 000	4, 000	6, 000	8, 500	300	280	300	425	2. 36	2. 10	1. 75	2. 24
Other	2, 300	4, 810	3, 250	4, 280	115	390	481	437	3. 52	1. 90	2. 93	1. 82
Colorado	1, 940	4, 000	6, 500	9, 500	120	200	358	770	1. 94	2. 84	1. 60	1. 30
New York	8, 070	6, 940	7, 500	7, 580	646	923	660	606	1. 33	1. 86	1. 30	2. 33
Oregon	-------	-------	100	200	-------	-------	12	25	-----	-----	1. 55	1. 60
Total	15, 310	19, 750	23, 350	30, 060	1, 181	1, 793	1, 811	2, 263	1. 87	2. 02	1. 87	1. 86
Grand total	42, 960	57, 190	60, 640	67, 320	2, 880	5, 041	5, 059	5, 434	2. 12	1. 96	1. 72	1. 79

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 249.—*Peas, green, for canning; commercial crop: Acreage, production, and price per pound, by States, 1926–1929*

State	Acreage				Production				Price per pound			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	1, 410	720	1, 100	1, 130	1, 128	1, 152	1, 980	2, 041	3. 5	3. 5	3. 5	3. 5
New York	34, 990	25, 540	32, 200	38, 810	62, 982	40, 864	48, 815	40, 572	3. 0	3. 0	3. 0	3. 0
New Jersey	350	500	350	400	700	1, 200	770	800	3. 0	3. 2	4. 0	3. 8
Pennsylvania	1, 400	1, 320	1, 680	1, 730	2, 520	3, 696	3, 063	4, 325	2. 9	2. 9	3. 0	3. 0
Ohio	4, 210	2, 990	4, 020	4, 380	5, 894	4, 784	6, 030	6, 570	3. 2	3. 1	2. 7	2. 2
Indiana	6, 000	1, 880	5, 290	5, 770	10, 800	3, 008	9, 797	9, 809	2. 6	2. 9	2. 0	2. 6
Illinois	9, 200	8, 830	8, 740	11, 010	16, 560	12, 362	15, 356	18, 056	3. 2	3. 0	2. 0	2. 5
Michigan	14, 430	8, 400	8, 500	9, 010	23, 088	11, 760	13, 294	11, 713	2. 5	2. 8	2. 0	2. 4
Wisconsin	106, 120	80, 000	101, 000	111, 000	233, 464	160, 000	203, 616	205, 350	2. 9	2. 8	3. 0	3. 0
Minnesota	8, 570	6, 980	7, 920	12, 670	6, 856	11, 168	16, 347	21, 184	2. 7	2. 2	2. 0	2. 7
Delaware	2, 000	1, 700	2, 060	2, 530	2, 000	5, 100	3, 529	5, 445	3. 8	3. 0	3. 0	3. 0
Maryland	8, 800	8, 000	10, 500	10, 800	17, 600	22, 400	20, 475	24, 840	3. 0	3. 0	3. 0	3. 0
Tennessee	(1)	(1)	1, 400	1, 400	(1)	(1)	2, 520	2, 520	(1)	(1)	3. 0	3. 0
Montana	(1)	(1)	3, 500	4, 200	(1)	(1)	7, 560	7, 812	(1)	(1)	2. 5	2. 5
Colorado	2, 570	1, 900	3, 000	3, 600	4, 626	3. 420	5, 700	6, 394	3. 0	3. 0	2. 5	2. 2
Utah	9, 510	8, 460	10, 150	11, 670	24, 726	20, 304	26, 035	26, 316	2. 9	2. 7	3. 0	2. 8
California	2, 680	750	1, 100	880	6, 432	2, 100	2, 420	799	3. 2	3. 0	2. 8	3. 0
Other States	6, 640	5, 840	3, 450	3, 500	10, 624	14, 016	6, 072	6, 650	2. 8	2. 4	3. 0	3. 0
Total	218, 880	163, 810	205, 960	229, 490	430, 000	317, 334	393, 379	401. 196	2. 9	2. 8	2. 8	2. 9

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

[1] Included in Other States prior to 1928.

Table 250.—*Peas: Car-lot shipments by State of origin, 1925–1929*

State	Crop movement season [1]				
	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*
New York	885	1,110	975	837	731
New Jersey	20	27	40	38	28
Maryland	48	55	54	68	52
Virginia	303	288	259	281	224
North Carolina	491	596	570	685	368
South Carolina	104	167	207	247	244
Mississippi	149	233	243	250	199
Idaho	13	40	101	176	238
Colorado	35	58	149	348	427
Washington	43	64	111	152	335
California [3]	223	859	1,328	1,529	2,174
Other States [3]	42	125	109	77	108
Total	2,356	3,622	4,146	4,688	5,128

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season is for calendar year except for Imperial Valley California, Florida, and Texas which begins in October of the preceding year.
[2] Preliminary.
[3] Figures for certain States include shipments in preceding year as follows: California, 1926, 4 cars in October, 220 in November, and 94 in December; 1927, 1 car in October, 223 in November, and 38 in December; 1928, 202 cars in November and 92 in December; 1929, 259 cars in November and 148 in December. Florida, 1927, 2 cars in December; 1928, 5 cars in November and 4 in December; 1929, 1 car in December. Texas, 1927, 1 car in December; 1928, 1 car in November.

Table 251.—*Peas, canned: Pack [1] in the United States, 1917–1929*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
New York	1,394	2,000	1,040	2,381	1,382	2,137	2,541	2,931	2,385	2,624	1,668	2,222	1,683
New Jersey [2]	755	332	248	549	345	153	199	331	257	143	267	242	383
Ohio	322	442	306	282	241	225	384	430	232	278	205	336	337
Indiana	604	454	381	271	182	268	367	483	86	500	90	427	389
Illinois	576	978	433	460	331	516	586	697	357	680	563	617	767
Michigan	523	477	425	549	317	455	392	710	451	723	399	542	558
Wisconsin	3,569	4,520	4,317	5,804	4,063	7,042	6,961	10,390	10,003	9,287	6,549	9,248	10,147
Minnesota [3]							254	470	432	446	497	722	926
Maryland	721	683	509	696	533	489	591	873	956	840	986	1,030	1,460
Utah	421	527	395	595	376	751	918	830	1,346	1,029	802	1,154	1,241
California	350	253	205	328	84	496	239	282	271	222	(4)	(4)	39
Other States	594	397	426	402	353	510	516	888	1,040	937	910	1,403	1,293
United States	9,829	11,063	8,685	12,317	8,207	13,042	13,948	19,315	17,816	17,709	12,936	17,943	19,223

Bureau of Agricultural Economics. Compiled from National Canners' Association 1917–1926; Census of Manufactures 1927–28; 1929 from The Canner, Oct. 5, 1929.

[1] Stated in cases of 24 No. 2 cans.
[2] Includes Delaware.
[3] Previous to 1923, included in "Other States."
[4] Included in "Other States."

TABLE 252.—*Peppers, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall: Florida	1, 940	1, 180	2, 510	920	885	406	643	157	1. 50	1. 69	. 93	3. 00
Early: Florida	1, 430	1, 520	3, 900	4, 780	463	485	1, 470	1, 601	2. 70	1. 25	1. 34	1. 46
Second Early:												
Louisiana	2, 860	3, 020	2, 220	2, 250	289	616	309	506	1. 38	1. 21	. 73	. 93
Mississippi	200	150	400	290	17	13	34	26	1. 70	1. 25	. 75	1. 00
North Carolina	650	620	670	630	124	81	134	158	1. 25	. 75	. 53	. 75
South Carolina				80				22				. 75
Total	3, 710	3, 790	3, 290	3, 250	430	710	477	712	1. 36	1. 16	. 68	. 89
Intermediate: New Jersey	7, 500	7, 000	7, 500	7, 800	1, 950	1, 680	1, 725	1, 404	. 63	. 75	. 65	. 65
Late:												
California	250	380	410	550	74	111	123	160	. 85	. 60	1. 23	. 80
Texas	730	900	280	510	110	144	28	69	. 80	. 82	1. 37	1. 25
Total	980	1, 280	690	1, 060	184	255	151	229	. 82	. 73	1. 25	. 93
Grand total	15, 560	14, 770	17, 890	17, 810	3, 912	3, 536	4, 466	4, 103	1. 16	1. 01	. 94	1. 11

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 253.—*Pimientos for canning, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

Group and State	Acreage				Production				Price per unit of production			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
California [1]	3, 510	3, 340	3, 250	2, 160	8, 390	10, 490	8, 420	7, 710	40. 00	40. 00	40. 00	40. 00
Georgia	1, 600	3, 700	5, 600	6, 900	4, 800	5, 990	7, 500	12, 350	37. 85	36. 09	38. 68	35. 12
Total 2 States	5, 110	7, 040	8, 850	9, 060	13, 190	16, 480	15, 920	20, 060	39. 27	38. 59	39. 38	36. 99

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

[1] Crop in California extends over into the following year.

TABLE 254.—*Potatoes: Acreage, production, value, exports, etc., United States, 1909–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Wholesale price per bushel at New York [1]	Domestic exports, year beginning July 1 [2]	Imports year beginning July 1 [2]	Net balance, year beginning July 1 [2,3]
	1,000 acres	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*	*Cents*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
1909	*3,669*	*106.1*	*389,195*						
1909	3,669	107.5	394,553	54.2	213,679	49	999	353	+646
1910	3,720	93.8	349,032	55.7	194,566	54	2,384	219	+2,177
1911	3,619	80.9	292,737	79.9	233,778	106	1,237	13,735	−12,283
1912	3,711	113.4	420,647	50.5	212,550	62	2,028	337	+1,693
1913	3,668	90.4	331,525	68.7	227,903	78	1,794	3,646	−1,823
1914	3,711	110.5	409,921	48.7	199,460	47	3,135	271	+2,866
1915	3,734	96.3	359,721	61.7	221,992	103	4,018	210	+3,810
1916	3,565	80.5	286,953	146.1	419,333	238	2,489	3,079	−558
1917	4,384	100.8	442,108	122.8	542,774	129	3,453	1,180	+2,273
1918	4,295	95.9	411,860	119.3	491,527	127	3,689	3,534	+205
1919	*3,252*	*89.3*	*290,428*						
1919	3,542	91.2	322,867	159.5	514,855	284	3,723	6,941	−3,212
1920	3,657	110.3	403,296	114.5	461,778	103	4,803	3,423	+1,399
1921	3,941	91.8	361,659	110.1	398,362	123	2,327	2,110	+222
1922	4,307	105.3	453,396	58.1	263,355	97	2,980	572	+2,408
1923	3,816	109.0	416,105	78.1	324,889	118	3,075	564	+2,512
1924	*2,911*	*121.1*	*352,462*						
1924	3,310	126.8	419,560	62.5	262,097	78	3,653	478	+3,187
1925	3,074	104.4	320,915	187.0	600,120	238	1,824	5,420	−3,575
1926	3,120	113.6	354,458	141.4	501,186	161	2,092	6,349	−4,205
1927	3,476	115.9	402,741	96.5	388,741	129	2,424	3,803	−1,313
1928	3,837	121.3	465,350	53.9	251,048	76	3,165	2,231	+996
1929 [4]	3,370	106.1	357,451	131.4	469,701				

Bureau of Agricultural Economics. Acreage, yield, and production figures are estimates of the crop-reporting board; italic figures are census returns. Prices received by producers are based upon returns from crop reporters. See 1927 Yearbook, p. 881, for data for earlier years.

[1] Compiled from Producers Price Current. Prices 1909–1919 are averages of the high and low weekly quotations of New York potatoes, October–June, converted from dollars per 180 pounds to cents per bushel beginning 1920, season September–May.

[2] Compiled from Commerce and Navigation of the United States, 1909–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926, January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce.

[3] The difference between total exports (domestic exports plus reexports) and total imports; + indicates net exports and − indicates net imports.

[4] Preliminary.

TABLE 255.—*Potatoes: Acreage and production, by States, average 1923–1927, annual 1926–1929*

State and division	Acreage					Production				
	Average, 1923–1927	1926	1927	1928	1929 [1]	Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Maine	138	127	161	181	172	36,994	36,830	37,352	39,820	47,644
New Hampshire	12	11	12	12	11	1,910	1,815	1,800	1,656	1,826
Vermont	21	20	21	21	19	3,346	3,100	3,255	2,982	2,850
Massachusetts	16	13	14	15	14	2,431	2,015	1,400	1,620	1,862
Rhode Island	2	3	2	2	2	312	450	220	244	250
Connecticut	16	14	15	17	16	2,260	2,170	1,635	2,210	2,080
New York	282	248	270	284	270	32,517	29,016	28,620	32,376	24,840
New Jersey	62	50	57	57	50	7,959	7,250	9,177	9,120	6,032
Pennsylvania	216	198	220	246	234	24,869	22,176	26,400	31,980	25,740
North Atlantic	765	684	772	835	788	112,599	104,822	109,859	122,008	113,124
Ohio	114	107	116	123	116	11,214	10,058	12,180	12,054	11,136
Indiana	56	48	53	61	55	5,210	3,840	5,035	6,649	4,620
Illinois	76	61	64	70	63	6,589	4,880	5,376	7,700	5,040
Michigan	270	249	289	306	263	29,401	29,880	23,120	35,802	18,410
Wisconsin	243	230	260	278	220	26,453	27,140	23,920	31,970	20,240
Minnesota	328	298	328	354	312	35,056	29,800	33,128	38,940	25,896
Iowa	78	74	75	81	75	6,955	5,846	6,150	10,935	7,650
Missouri	81	81	68	85	81	6,817	6,480	5,644	10,285	5,508
North Dakota	119	94	113	141	145	10,180	7,520	11,526	14,805	6,960
South Dakota	67	55	60	67	67	5,530	3,300	6,900	6,030	4,422
Nebraska	88	73	84	105	92	7,431	5,329	8,904	10,080	8,924
Kansas	51	43	49	54	47	4,556	3,913	5,390	7,560	4,375
North Central	1,571	1,413	1,559	1,725	1,536	155,390	137,986	147,273	192,810	123,181
Delaware	7	6	6	7	7	609	516	714	658	546
Maryland	41	39	43	47	40	3,723	3,510	5,246	5,405	4,000
Virginia	135	124	130	151	132	15,118	11,656	19,760	21,618	17,461
West Virginia	48	47	52	60	57	5,020	4,982	5,876	7,500	6,555
North Carolina	61	67	72	95	74	5,742	6,325	7,368	10,545	8,130
South Carolina	29	29	29	36	22	3,056	3,219	3,034	4,068	2,354
Georgia	19	19	17	22	20	1,263	1,197	1,304	1,682	1,572
Florida	25	24	29	31	23	2,606	2,832	3,045	3,875	2,714
South Atlantic	366	355	378	449	375	37,137	34,237	46,347	55,351	43,332
Kentucky	50	47	52	57	50	4,347	4,512	4,732	5,985	4,400
Tennessee	36	35	39	43	39	2,783	2,730	3,432	4,086	3,585
Alabama	32	29	33	38	28	2,394	2,030	2,475	2,812	2,408
Mississippi	12	12	12	15	14	921	852	936	1,329	1,222
Arkansas	30	32	29	36	31	1,889	1,920	1,972	2,700	2,697
Louisiana	32	36	41	41	31	2,041	2,196	2,665	2,870	1,977
Oklahoma	40	43	45	63	44	2,721	2,860	2,925	5,038	3,294
Texas	30	30	35	39	31	1,878	2,100	2,310	2,690	2,393
South Central	262	264	286	332	268	18,973	19,200	21,447	27,510	21,976
Montana	35	35	36	37	33	3,713	2,975	4,860	4,255	1,980
Idaho	82	91	115	116	102	15,599	16,198	24,380	19,720	17,136
Wyoming	15	13	17	21	19	1,652	1,456	2,329	2,352	2,090
Colorado	84	82	96	110	88	12,441	11,890	14,400	13,420	12,320
New Mexico	2	2	2	2	2	144	166	150	132	182
Arizona	4	4	4	3	3	223	220	320	222	240
Utah	17	17	22	23	18	2,488	2,465	2,970	3,312	3,330
Nevada	5	5	6	6	5	711	700	780	840	850
Washington	61	67	79	70	56	9,708	10,720	13,430	9,450	8,680
Oregon	44	45	52	52	42	4,584	4,500	6,240	6,240	3,780
California	47	43	52	56	35	7,394	6,923	7,956	7,728	5,250
Far Western	396	404	481	496	403	58,657	58,213	77,815	67,671	55,838
United States	3,359	3,120	3,476	3,837	3,370	382,756	354,458	402,741	465,350	357,451

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 256.—*Potatoes: Yield per acre and estimated price per bushel, December 1, by States, averages, and annual, 1924–1929*

State and division	Yield per acre							Estimated price per bushel						
	Av. 1918–1927	1924	1925	1926	1927	1928	1929	Av. 1923–1927	1924	1925	1926	1927	1928	1929
	Bush.	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Bush.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Maine	244	315	250	290	232	220	277	106	43	200	133	85	40	120
New Hampshire	145	170	145	165	150	138	166	149	84	235	170	140	80	160
Vermont	142	160	125	155	155	142	150	133	85	215	140	125	85	150
Massachusetts	128	150	140	155	100	108	133	162	96	245	180	155	90	180
Rhode Island	125	140	140	150	110	122	125	161	95	245	180	155	90	180
Connecticut	122	130	135	155	109	130	130	168	100	250	180	165	90	180
New York	112	140	86	117	106	114	92	130	57	215	160	125	65	145
New Jersey	127	150	106	145	161	160	121	134	67	230	155	110	50	160
Pennsylvania	107	118	123	112	120	130	110	134	80	194	170	120	65	160
North Atlantic	135.0	167.9	132.6	153.2	142.3	146.1	143.6	125.0	59.7	207.0	152.8	110.2	57.2	140.3
Ohio	87	88	106	94	105	98	96	136	89	200	170	120	75	155
Indiana	81	99	83	80	95	109	84	131	80	216	165	110	70	150
Illinois	73	110	60	80	84	110	80	138	75	235	175	115	65	155
Michigan	101	130	103	120	80	117	70	90	35	162	120	90	40	125
Wisconsin	105	130	112	118	92	115	92	92	36	170	120	85	40	120
Minnesota	99	132	97	100	101	110	83	79	27	154	115	60	30	100
Iowa	82	136	63	79	82	135	102	127	55	235	170	100	51	140
Missouri	75	98	57	80	83	121	68	136	82	225	170	115	60	150
North Dakota	85	90	72	80	102	105	48	79	39	150	120	50	30	105
South Dakota	80	82	65	60	115	90	66	97	48	180	159	55	40	115
Nebraska	82	87	75	73	106	96	97	109	62	180	160	75	50	110
Kansas	79	95	67	91	110	140	93	139	91	235	170	100	45	145
North Central	91.7	115.2	88.8	97.7	94.5	111.8	80.2	99.4	45.9	177.7	134.1	82.6	43.8	124.0
Delaware	86	90	64	86	119	94	78	120	80	200	140	80	75	160
Maryland	89	83	73	90	122	115	100	124	81	194	140	105	50	120
Virginia	110	131	90	94	152	143	132	127	82	195	140	130	50	125
West Virginia	100	95	87	106	113	125	115	138	98	193	167	125	80	140
North Carolina	91	105	78	94	102	111	110	144	112	180	160	150	65	120
South Carolina	97	111	96	111	105	113	107	175	145	210	170	190	65	140
Georgia	69	72	49	63	77	76	79	175	150	210	190	165	115	140
Florida	101	88	124	118	105	125	118	220	165	260	300	185	150	180
South Atlantic	99.1	108.4	86.0	96.4	122.6	123.3	115.6	143.0	101.2	200.3	165.4	137.5	67.3	131.1
Kentucky	82	100	60	96	91	105	88	141	102	200	155	130	80	135
Tennessee	74	80	56	78	88	95	92	142	112	195	157	135	90	135
Alabama	75	90	57	70	75	74	86	173	155	220	190	150	85	145
Mississippi	78	81	67	71	78	89	87	173	164	200	180	165	120	155
Arkansas	64	74	60	60	68	75	87	162	128	210	185	150	80	140
Louisiana	66	68	60	61	65	70	64	173	150	210	190	165	100	145
Oklahoma	65	70	72	67	65	80	75	167	130	225	170	180	75	130
Texas	61	67	53	70	66	69	77	187	170	240	200	165	100	150
South Central	71.1	80.5	60.6	72.7	75.0	82.9	82.0	160.6	130.7	212.2	174.3	151.4	87.1	139.6
Montana	107	88	108	85	135	115	60	99	87	160	120	65	55	170
Idaho	183	170	196	178	212	170	168	82	54	145	105	55	45	120
Wyoming	114	95	120	112	137	112	110	107	87	160	125	70	65	130
Colorado	142	145	195	145	150	122	140	91	60	155	130	55	45	110
New Mexico	68	52	75	83	75	66	91	152	104	200	175	120	95	150
Arizona	75	54	57	55	80	74	80	166	150	230	200	110	110	170
Utah	161	137	160	145	135	144	185	91	74	133	105	75	45	100
Nevada	151	131	170	140	130	140	170	123	106	190	130	85	85	150
Washington	148	150	155	160	170	135	155	95	85	165	95	60	50	145
Oregon	104	96	104	100	120	120	90	98	95	150	100	75	70	140
California	147	162	159	161	153	138	150	126	90	200	132	95	65	140
Far Western	141.2	137.7	158.5	144.1	161.8	136.4	138.6	95.9	74.1	159.5	113.2	64.0	52.4	126.6
United States	106.4	126.8	104.4	113.6	115.9	121.3	106.1	113.1	62.5	187.0	141.4	96.5	53.9	131.4

Bureau of Agricultural Economics. Yield figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

TABLE 257.—*Potatoes: Acreage, yield per acre and production in specified countries, average 1909–1913, 1921–1925, annual 1927–1929*

Country	Acreage					Yield per acre					Production				
	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929 preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929 preliminary	Average, 1909–1913 [1]	Average, 1921–1925	1927	1928	1929 preliminary
NORTHERN HEMISPHERE	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
North America:															
Canada	483	606	572	599	544	161.2	149.9	135.4	139.7	136.9	77,843	90,838	77,130	83,658	74,447
United States	3,677	3,697	3,476	3,837	3,370	97.3	107.5	115.9	121.3	106.1	357,699	395,242	402,741	465,350	357,451
Total	4,160	4,303	4,048	4,436	3,914	104.7	113.0	118.6	123.8	110.3	435,542	486,080	480,171	549,008	431,898
Europe:															
United Kingdom	746	814	814	789	816	232.6	234.3	225.2	269.7	------	173,520	190,685	183,344	212,768	------
Irish Free State	420	398	365	364	363	192.7	170.0	249.9	230.4	------	80,924	67,666	91,212	83,863	------
Norway	102	121	123	125	------	242.9	229.7	183.7	279.5	------	24,780	27,796	22,589	34,933	34,615
Sweden	377	387	345	345	348	152.7	167.9	100.6	195.6	176.6	57,581	64,966	34,719	67,468	61,450
Denmark	161	196	177	154	------	202.7	224.9	117.2	279.8	------	32,642	44,071	20,746	43,086	------
Netherlands	411	430	428	443	446	253.2	276.7	216.8	320.6	271.9	104,051	118,990	92,783	142,010	121,252
Belgium	404	406	416	411	421	274.3	265.4	292.3	324.9	267.7	110,830	107,736	121,590	133,531	112,710
France	4,066	3,607	3,699	3,639	3,657	129.6	125.1	174.1	113.7	167.0	526,793	451,353	643,997	413,875	610,601
Spain	[2] 642	[3] 784	763	802	------	[2] 176.0	[3] 123.5	173.8	130.6	------	[2] 112,997	[3] 96,860	132,646	104,718	------
Italy	759	840	874	875	891	89.0	78.7	81.8	62.6	82.9	67,514	66,079	71,477	54,742	73,896
Switzerland	[4] 115	111	118	118	119	[4] 214.5	217.1	216.6	209.4	239.3	[3] 24,664	24,103	25,554	24,710	28,476
Germany	6,775	6,753	6,954	7,040	7,006	202.7	193.2	198.4	215.4	210.2	1,373,609	1,304,447	1,379,716	1,516,373	1,472,563
Austria	436	390	453	468	465	122.4	138.9	216.3	195.4	171.5	53,373	54,183	97,973	91,428	79,758
Czechoslovakia	1,849	1,580	1,607	1,800	1,798	132.6	156.4	208.3	175.4	189.3	245,210	247,176	334,705	315,719	340,343
Hungary	619	639	642	655	684	114.9	89.1	114.7	82.5	126.6	71,118	56,936	73,667	54,031	86,587
Yugoslavia	458	537	558	580	581	101.1	68.0	66.4	54.0	------	46,288	36,528	37,063	31,312	------
Rumania	[3] 399	568	616	656	------	------	101.2	128.2	114.9	------	43,086	57,489	78,949	75,404	------
Poland	5,693	5,443	6,029	6,189	------	156.2	148.4	163.2	164.2	------	889,531	807,919	983,655	1,016,339	884,774
Lithuania	403	374	343	300	326	101.4	162.2	135.4	117.5	221.0	40,864	60,654	46,444	35,263	72,053
Latvia	209	178	211	193	204	120.7	138.4	124.9	59.8	202.8	25,217	24,644	26,358	11,539	41,361
Estonia	190	173	176	160	152	144.9	149.0	154.8	115.1	181.7	27,526	25,773	27,253	18,412	27,613
Finland	[5] 181	167	174	172	175	101.9	130.6	160.1	147.2	173.6	18,443	21,809	27,852	25,312	30,375
Russia	7,225	8,944	13,560	13,971	------	102.5	129.1	111.7	104.9	------	740,728	1,154,635	1,514,483	1,466,217	------
Total European countries reporting area and production, all years	16,794	16,035	16,440	16,619	16,692	163.6	163.9	182.7	174.8	189.3	2,746,793	2,628,849	3,004,088	2,904,413	3,159,038
Estimated European total, excluding Russia	25,500	25,100	26,100	26,500	26,300	------	------	------	------	------	4,165,000	3,977,000	4,610,000	4,563,000	4,692,000

Total Northern Hemisphere reporting area and production, all years	20,954	20,338	20,488	21,055	20,606	151.9	153.2	170.1	164.0	174.3	3,182,335	3,114,929	3,484,259	3,453,421	3,590,936
Estimated Northern Hemisphere total, excluding Russia	30,100	30,100	30,900	31,700	31,100						4,647,000	4,532,000	5,158,000	5,179,000	5,190,000
SOUTHERN HEMISPHERE															
Brazil		[4] 104					[4] 84.7					[4] 8,806	9,922	7,092	
Chile	69	74	72			123.3	144.1				8,510	10,664	11,994		
Argentina	217	331	311	303		140.6	90.2	81.3	84.2		30,515	29,865	25,282	25,514	
Australia	144	139	163			100.5	97.2	107.7			14,469	13,511	17,548		
Estimated Southern Hemisphere total	700	1,100	1,500	1,500							76,000	90,000	87,000		
Estimated world total, excluding Russia and China	30,800	31,200	32,400	33,200							4,723,000	4,622,000	5,245,000		

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture. Estimates given are for crops harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] Average for countries having changed boundaries are estimates for present boundaries. [2] 2-year average. [3] 4-year average. [4] 3-year average. [5] 1 year only.

TABLE 258.—*Potatoes, early, commercial crop: Acreage, production, and price per bushel, by States, 1926–1929*

Group and State	Acreage				Production				Price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall: Texas	150	350	300	750	11	18	18	38	2.00	1.40	1.42	1.05
Early:												
Florida	23,070	28,000	30,000	22,000	2,722	2,940	3,750	2,596	3.04	1.84	1.49	1.75
Texas (Lower Valley)	6,350	13,460	10,520	9,800	660	740	736	980	2.79	1.81	1.72	1.65
Total	29,420	41,460	40,520	31,800	3,382	3,680	4,486	3,576	2.99	1.83	1.53	1.72
Alabama	12,750	13,200	17,700	8,670	982	1,109	1,504	763	1.78	1.37	.75	1.52
California	14,980	17,800	22,650	10,300	2,097	1,798	2,741	906	1.23	1.08	.61	1.22
Georgia	2,250	2,250	2,500	1,550	191	259	225	150	2.17	1.96	.80	1.49
Louisiana	20,000	21,860	21,800	15,100	1,200	1,421	1,526	966	2.06	1.69	1.00	1.50
Mississippi	1,300	1,700	1,950	1,560	104	136	176	137	1.77	1.27	1.12	1.55
North Carolina	29,000	36,000	46,400	25,000	3,480	4,320	6,403	3,300	1.68	1.91	.54	1.10
South Carolina	18,720	18,000	24,000	14,000	2,527	2,070	3,360	1,918	1.72	1.92	.56	1.30
Texas (other)	5,230	8,300	13,580	8,750	397	681	896	508	1.68	1.56	.70	1.27
Virginia	89,000	78,700	90,900	77,900	9,345	14,087	15,908	11,997	1.32	1.36	.41	1.18
Total	192,230	197,810	241,480	162,830	20,323	25,881	32,739	20,644	1.50	1.51	.53	1.21
Total, all early	222,650	239,270	282,000	194,630	23,705	29,561	37,225	24,220	1.72	1.55	.65	1.29
Second early:												
Arkansas	4,180	3,890	6,030	3,440	280	276	555	310	1.50	1.67	.53	1.00
Kansas	15,800	17,300	18,160	12,890	2,481	2,508	3,505	1,418	.83	.85	.25	1.13
Kentucky	5,620	5,340	5,340	4,270	584	662	1,041	705	1.25	.94	.38	1.35
Maryland	14,800	15,400	17,240	14,650	1,421	2,156	2,620	1,831	.97	1.20	.33	1.20
Missouri	5,000	5,180	6,400	4,610	1,000	648	1,280	553	.77	1.08	.38	1.35
Nebraska	1,200	1,700	1,900	1,750	132	255	285	262	.75	.75	.50	1.20
New Jersey	40,000	44,800	45,000	39,000	5,600	7,213	7,290	5,031	1.37	.81	.45	1.60
Oklahoma	14,400	15,000	17,000	12,000	1,411	1,530	1,428	1,080	1.52	2.00	.37	.95
Tennessee	-------	-------	2,000	1,500	-------	-------	228	165	-----	-----	.60	1.16
Total	101,000	108,610	119,070	94,110	12,909	15,248	18,232	11,355	1.18	1.02	.38	1.36
Grand total	323,800	348,230	401,370	289,490	36,625	44,827	55,475	35,613	1.53	1.37	.56	1.31

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 259.—*Potatoes: Certified seed production, 1924–1928*

State	1924	1925	1926	1927	1928
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Bushels*
California	------------	12,050	12,075	17,800	12,000
Colorado	22,037	28,560	31,300	77,105	57,890
Idaho	------------	278,148	371,479	866,162	349,509
Maine	5,052,681	2,226,050	2,294,845	3,278,101	5,094,128
Maryland	------------	8,205	18,390	32,078	21,581
Michigan	291,086	214,656	337,000	162,397	854,742
Minnesota	777,800	596,605	693,685	621,999	1,162,540
Montana	31,950	67,800	113,365	180,562	236,499
Nebraska	79,750	121,200	60,200	181,500	152,400
New Hampshire	30,328	12,287	2,695	14,778	17,250
New Jersey	81,850	57,911	92,916	475	100,355
New York	363,065	210,700	225,371	323,080	470,528
North Dakota	101,836	171,110	181,400	321,305	539,855
Ohio	11,230	4,120	5,600	6,300	6,150
Oregon	15,900	27,600	46,000	87,840	154,237
Pennsylvania	65,000	25,965	41,115	29,870	60,490
South Dakota	------------	23,600	28,441	49,856	59,309
Vermont	225,000	108,655	160,031	252,582	136,119
Washington	------------	17,550	30,300	121,350	81,825
Wisconsin	357,074	163,025	196,500	243,000	448,400
Wyoming	------------	21,000	138,000	259,500	350,000
Total	7,506,587	4,396,797	5,080,708	7,127,640	10,365,807

Bureau of Agricultural Economics. As reported by certifying officials.

TABLE 260.—*Potatoes: Car-lot shipments, by State of origin, 1927–1929*

State and year	Crop movement season [1]																
	Apr.	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Florida: [2]																	
1927	3,747	1,601	47	7	1	1		1	27								5,432
1928 [3]	1,447	5,895	365	10					1								7,718
1929 [3]	3,987	1,061	7	8	3			3									
Texas: [4]																	
1927	1,224	1,366	404	7		1	1	1	23	12	10						3,049
1928 [3]	1,094	1,326	893	93	12		5		15	53	28						3,519
1929 [3]	1,526	439	664	36		2			4								
Louisiana: [5]																	
1927	436	679	157					19	7								1,298
1928 [3]	36	1,167	488	9	9	5		4	5	2	2						1,727
1929 [3]	92	746	251	3			1										
Alabama:																	
1927	27	1,833	228	10			2		1	1							2,102
1928 [3]		934	2,121	66	6	2	1				3						3,133
1929 [3]	12	1,126	388	13	3												
California:																	
1927	1	92	882	929	1,173	1,041	745	744	661	688	558	282	121	53			7,970
1928 [3]	6	392	974	607	678	794	828	711	688	836	533	406	79	30			7,562
1929 [3]		107	614	932	1,045	987	945	700	603								
South Carolina:																	
1927		3,313	629	1													3,943
1928 [3]		1,161	3,438	40	42	16	6		1	2							4,706
1929 [3]		3,146	634	15	6			1	1								
North Carolina:																	
1927		219	6,781	438	39	60	10	4	1		1	2					7,555
1928 [3]		13	7,623	1,008	553	390	113	33	7	5	8	2	1				9,736
1929 [3]		482	4,857	466	143	26	4	2	4								
Virginia:																	
1927			8,752	13,241	1,466	88	53	46	6	1	16	29	15	4			23,717
1928 [3]			8,631	13,913	4,128	597	176	92	20	3	6	5	14	94			27,679
1929 [3]			10,022	10,489	514	69	26	17	1								

[1] Crop movement season extends from Apr. 1 of one year through July of the following year, except in Florida where the season begins in March.
[2] Totals for April include cars moved earlier as follows: 1927, 6 in February, 547 in March; 1928, 46 in January, 57 in February, and 143 in March; 1929, 5 in January, 37 in February, and 1,013 in March.
[3] Preliminary.
[4] Totals for April include cars moved earlier, as follows: 1927, 158 in March; 1928, 132 in March; 1929, 3 in February and 263 in March.
[5] Total for April include cars moved in March, as follows: 1 in 1928, 6 in 1929.

TABLE 260.—*Potatoes: Car-lot shipments, by State of origin, 1927–1929*—Continued

State and year	Crop movement season																
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Oklahoma:																	
1927		5	1,981	105	2			6	3	14	14						2,130
1928 [3]			1,313	666	35	7		1		18	17	1					2,058
1929 [3]			1,704	605	3												
Maryland:																	
1927			115	2,488	616	16	9	31	24	27	42	109	59	9			3,545
1928 [3]			27	1,952	1,001	92	12	12	2	1	2	11	10	1			3,123
1929 [3]			17	2,197	129	12	28	26	1								
Kansas:																	
1927			11	2,081	1,459	686	66	29		4	5						4,341
1928 [3]			1	971	1,731	1,382	557	137	34	24	3	7		1			4,848
1929 [3]			1	1,570	831	33	3	1									
Washington:																	
1927				271	335	886	1,326	1,098	565	735	905	1,909	802	618	162		9,612
1928 [3]				398	528	916	951	796	511	658	764	783	916	554	274		8,049
1929 [3]				310	520	939	1,581	885	391								
New Jersey:																	
1927				188	4,893	1,399	63	56	7	3	1	55	11				6,676
1928 [3]				5	2,644	2,062	543	76	13	8	6	9	1				5,367
1929 [3]				826	2,922	37	12	3									
Idaho:																	
1927				115	764	1,782	2,869	2,792	2,135	3,423	3,740	3,492	3,240	3,257	696		28,305
1928 [3]				51	233	863	1,831	1,926	1,650	2,363	2,566	2,511	2,721	1,881	291		18,887
1929 [3]				72	788	1,522	2,833	1,876	1,794								
Colorado:																	
1927				63	788	2,748	3,207	2,173	1,478	2,140	1,780	1,253	847	713	138		17,328
1928 [3]				83	542	1,855	2,144	1,481	1,281	2,360	1,679	1,223	747	286	33		13,714
1929 [3]				126	1,026	2,576	2,552	1,392	1,534								
New York:																	
1927				31	1,554	2,482	2,736	1,397	716	885	914	767	567	248	23		12,320
1928					641	1,622	2,655	1,693	1,019	1,342	1,257	1,462	1,079	402	38	1	13,211
1929 [3]				44	1,735	1,104	1,294	696	591								
Minnesota:																	
1927				20	1,265	4,777	8,990	3,226	1,098	2,191	4,264	4,249	1,652	1,363	387		33,482
1928 [3]				119	707	1,753	4,055	1,659	573	1,143	2,417	3,960	1,656	1,822	589	3	20,456
1929 [3]				229	2,412	3,624	4,235	1,455	919								
Oregon:																	
1927				26	64	40	197	381	243	191	244	606	259	82	6		2,339
1928 [3]				11	45	92	310	311	160	123	89	149	253	97	13		1,653
1929 [3]				21	42	47	287	195	132								

Nebraska:																	
1927					577	625	1, 113	718	372	1, 127	975	403	97	25	7		6, 039
1928 [3]				2	197	535	485	512	412	839	940	525	215	115	17		4, 794
1929 [3]				14	600	1, 009	1, 828	615	572								
Maine:																	
1927					467	3, 051	6, 759	4, 207	3, 948	4, 901	4, 624	3, 993	3, 903	4, 080	986	26	40, 945
1928 [3]					36	2, 874	5, 984	3, 862	3, 801	5, 671	5, 061	4, 978	4, 004	3, 134	1, 608	98	41, 111
1929 [3]					1, 146	6, 931	8, 800	4, 724	5, 712								
Wisconsin:																	
1927					297	1, 744	2, 215	1, 323	1, 020	1, 842	1, 970	2, 092	1, 374	990	584	4	15, 455
1928 [3]					332	1, 763	1, 872	1, 284	1, 135	1, 550	1, 799	1, 824	1, 338	1, 820	1, 091	41	15, 849
1929 [3]					1, 462	1, 805	1, 681	1, 004	1, 495								
Pennsylvania:																	
1927					28	555	853	636	205	309	367	259	136	26	1		3, 375
1928 [3]					15	486	1, 055	1, 027	585	881	671	540	374	159	6		5, 829
1929 [3]				2	98	211	345	339	227								
Michigan:																	
1927					27	331	846	918	784	931	1, 029	1, 390	1, 124	893	292	3	8, 568
1928 [3]					10	678	1, 977	1, 436	836	1, 487	1, 364	1, 634	1, 762	2, 038	952	15	14, 189
1929 [3]					14	132	451	424	439								
North Dakota:																	
1927					6	1, 249	3, 248	328	125	439	844	1, 183	258	50	3		7, 933
1928 [3]						389	2, 453	407	168	308	748	1, 143	321	318	72	5	6, 332
1929 [3]					2	1, 425	1, 889	291	157								
Other States:																	
1927	3	467	689	965	2, 032	1, 441	3, 025	790	246	368	553	1, 361	586	301	39		12, 866
1928 [3]		140	477	1, 011	2, 117	1, 954	1, 893	772	290	338	398	505	357	270	54		10, 576
1929 [3]		233	563	1, 556	1, 902	1, 598	2, 475	650	249								
Total:																	
1927	[6] 5, 438	9, 575	20, 676	20, 986	17, 853	25, 003	38, 333	21, 124	13, 695	20, 232	22, 856	23, 434	15, 051	12, 712	3, 324	33	270, 325
1928 [3]	[7] 2, 583	11, 028	26, 351	21, 015	16, 252	21, 127	29, 906	18, 232	13, 207	20, 015	20, 361	21, 678	15, 848	13, 022	5, 038	163	255, 826
1929 [3]	[8] 5, 617	7, 340	19, 722	19, 534	17, 346	24, 089	31, 270	15, 299	14, 826								

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. Figures for earlier years appear in 1927 and earlier Yearbooks.

[3] Preliminary.
[6] Includes 6 cars in February and 705 in March.
[7] Includes 46 cars in January, 57 in February, and 276 in March.
[8] Includes 5 cars in January, 40 in February and 1, 282 in March.

TABLE 261.—*Potatoes: Car-lot shipments, United States, by months, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
1920	13, 752	9, 471	14, 612	9, 297	7, 043	14, 042	15, 317	14, 119	18, 875	32, 170	26, 067	10, 411	185, 176
1921	14, 477	12, 487	16, 449	14, 948	14, 926	16, 421	15, 606	16, 240	26, 322	42, 956	16, 729	10, 440	218, 001
1922	16, 721	13, 722	22, 334	20, 059	20, 284	22, 104	18, 833	18, 239	24, 420	35, 193	21, 050	12, 448	245, 407
1923	17, 262	14, 609	24, 468	23, 199	16, 302	20, 295	16, 733	16, 735	24, 063	35, 223	20, 737	11, 977	241, 603
1924	19, 762	20, 716	22, 940	19, 461	18, 736	20, 845	23, 626	16, 394	21, 387	34, 141	20, 852	13, 237	252, 097
1925	21, 715	20, 394	21, 639	20, 123	20, 215	19, 798	17, 765	14, 864	23, 569	33, 631	16, 286	11, 524	241, 523
1926	16, 185	14, 834	19, 974	14, 238	16, 903	23, 587	20, 310	15, 327	22, 978	36, 182	18, 419	13, 487	232, 424
1927	17, 974	17, 784	21, 497	20, 283	16, 691	22, 155	21, 053	17, 853	25, 003	38, 333	21, 124	13, 695	253, 445
1928	20, 278	22, 913	23, 710	17, 255	23, 740	29, 675	21, 048	16, 252	21, 127	29, 906	18, 232	13, 207	257, 343
1929 [1]	20, 020	20, 401	22, 960	20, 138	20, 362	24, 760	19, 697	17, 346	24, 089	31, 270	15, 299	14, 826	251, 168

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis, 400 to 700 bushels to a carload.

[1] Preliminary.

TABLE 262.—*Potatoes: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average, 1911–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
Netherlands	1, 952	16, 451	434	15, 552	494	18, 387	748	16, 988	1, 231	17, 833
France	7, 143	8, 683	6, 795	10, 350	14, 449	8, 186	9, 821	9, 347	13, 653	12, 653
Italy	242	3, 975	212	7, 731	461	9, 524	505	8, 295	4, 265	7, 612
Poland	0	0	35	3, 535	4	4, 468	8	5, 103	8	2, 929
Belgium	4, 921	8, 692	4, 804	3, 778	4, 502	9, 400	3, 813	6, 951	4, 166	14, 249
Canada	525	1, 207	572	6, 281	467	8, 169	504	7, 687	708	6, 309
Argentina	1, 337	543	281	1, 252	226	2, 234	8	2, 966	------	1, 901
Spain	0	1, 835	1, 248	1, 321	218	2, 227	------	------	------	------
Hungary	0	0	117	1, 238	82	4, 987	211	2, 662	435	2, 255
Czechoslovakia	0	0	574	179	1, 708	46	1, 498	2, 729	534	1, 208
Estonia	0	0	0	851	1	396	3	1, 310	0	1, 399
Japan	0	440	0	474	0	485	0	733	0	728
Denmark	40	928	357	90	217	117	741	47	2, 028	38
China	36	288	0	169	0	175	0	124	------	------
Russia	309	7, 762	[1] 15	[1] 29	[1] 7	[1] 35	[1] 6	[1] 1, 066	------	------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	11, 382	6, 246	18, 331	1, 614	12, 618	1, 937	10, 838	3, 039	17, 774	1. 850
Germany	29, 180	12, 412	14, 395	9, 774	15, 975	3, 565	23, 484	2, 537	17, 956	6. 683
Cuba	2, 001	2	4, 827	9	3, 570	49	4, 076	78	------	------
Austria	[2] 4, 070	[2] 1, 451	2, 215	[1] 33	3, 873	129	2, 424	194	2, 066	3, 001
Switzerland	3, 172	42	2, 264	6	2, 615	4	1, 887	3	2, 822	5
Uruguay	[3] 768	1	1, 536	0	1, 631	1	1, 452	[1] 1	1, 201	------
United States	5, 707	1, 814	2, 433	2, 323	5, 728	2, 033	5, 272	2, 379	3, 244	2, 698
Algeria	1, 218	931	1, 313	1, 795	1, 165	1, 553	1, 381	1, 152	1, 783	1, 396
Portugal	273	500	[1] 1, 398	[1] 155	[1] 1, 178	[1] 269	------	------	------	------
Finland	479	15	635	0	493	0	327	2	738	------
Egypt	599	[3] 28	841	77	827	77	853	101	753	247
Irish Free State	0	0	707	741	880	636	566	1, 018	322	1, 350
Brazil	939	0	496	2	1, 588	0	1, 314	0	1, 023	------
Tunis	[4] 294	[4] 2	361	3	357	3	436	2	409	3
Sweden	700	64	344	3	36	16	615	158	1, 082	1
Philippine Islands	334	0	322	0	336	0	345	0	------	------
Norway	215	60	157	20	1	76	52	87	99	15
Total 32 countries	77, 836	74, 372	68, 019	69, 385	75, 707	79, 184	73, 188	76, 759	78, 309	86, 363

Bureau of Agricultural Economics. Official sources except where otherwise noted. These figures do not include sweetpotatoes.

[1] International Yearbook of Agricultural Statistics.
[2] Average for Austria-Hungary.
[3] 1 year only.
[4] 2-year average.

TABLE 263.—*Potatoes: Estimated average price per bushel, received by producers, United States, 1909–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	88.0	78.3	67.9	61.0	56.0	55.0	56.1	55.4	51.0	42.9	37.9	38.8	57.9
1910	52.5	68.9	70.4	61.8	55.7	54.9	54.6	55.2	55.4	59.0	62.9	79.8	61.3
1911	116.2	124.8	101.0	82.3	78.1	82.2	89.4	98.2	109.6	122.2	123.5	111.6	99.6
1912	95.0	75.8	58.0	48.3	48.0	50.6	51.8	52.6	51.2	49.2	51.7	52.5	55.6
1913	59.5	72.2	74.6	71.8	69.2	68.6	69.0	70.2	70.4	70.7	71.4	76.4	70.6
1914	84.3	81.0	69.8	58.8	50.8	49.2	50.0	50.4	49.1	49.2	50.6	51.4	58.0
1915	54.2	53.4	49.6	54.8	61.2	66.2	79.3	91.2	96.0	96.2	96.8	100.6	70.8
1916	98.8	102.4	110.6	123.8	140.9	146.7	159.8	206.6	237.7	257.2	276.8	261.0	166.3
1917	209.4	155.0	130.6	125.0	125.3	121.9	122.0	121.6	106.4	86.4	77.8	85.2	122.5
1918	118.2	145.2	146.2	135.4	123.2	117.7	115.2	111.9	107.4	112.2	120.2	124.9	125.6
1919	160.6	190.2	175.8	158.5	156.2	169.0	198.1	230.6	269.6	344.6	407.4	403.6	223.8
1920	344.4	243.9	159.8	126.6	116.4	110.0	100.6	89.8	80.9	72.9	67.6	68.5	131.5
1921	103.4	152.8	153.1	130.6	116.8	109.4	112.0	116.6	115.7	109.0	104.2	103.7	121.3
1922	109.0	101.4	78.8	66.2	60.5	58.8	62.0	64.2	68.6	77.4	79.0	79.8	73.9
1923	102.9	120.8	109.6	91.4	82.5	81.5	86.4	88.1	87.8	91.1	91.3	100.7	94.2
1924	109.0	111.3	81.0	68.8	63.5	64.1	70.2	72.3	71.4	70.5	70.6	84.4	76.5
1925	125.5	155.4	121.1	125.6	198.4	201.5	220.5	226.0	225.6	270.5	244.8	190.1	183.5
1926	174.6	140.5	130.6	126.4	141.3	137.0	139.1	134.1	127.0	126.8	146.0	191.0	140.8
1927	183.1	146.3	107.4	97.9	95.4	94.1	93.6	96.2	113.1	116.8	103.3	83.6	108.4
1928	77.9	73.1	64.8	58.0	56.9	57.7	58.9	59.5	58.4	55.3	59.3	63.3	61.3
1929	87.0	138.6	135.5	138.2	134.8	135.3							

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of potatoes for each State; yearly price obtained by weighing monthly prices by average monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923.

TABLE 264.—*Potatoes: Shipping-point price, per 100 pounds in car lots, Minneapolis, 1919–1929* [1]

Year	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1919	2.97	2.55	2.36	2.63	3.00	4.22	4.16	5.21	6.89	7.14	
1920	[2] 2.62	[2] 1.98	1.57	1.82	1.34	1.14	.95	1.14	.85	.79	
1921	[2] 2.20	1.95	1.72	1.47	1.45	1.73	1.58	1.43	1.32	1.41	1.62
1922	[2] .99	[2] .92	[2] .77	.69	.64	.62	.61	.86	1.08	.84	.69
1923	1.54	1.19	.86	.81	.85	1.12	1.08	1.04	1.15	1.09	1.48
1924		.77	.67	.68	.73	.90	.87	.84	.69	.99	1.28
1925	2.11	1.83	2.39	3.39	3.48	3.92	3.55	3.85	4.49	3.11	
1926		2.20	2.19	2.21	2.09	2.08	1.81	1.78	1.91	2.96	3.98
1927	1.42	1.32	1.26	1.30	1.32	1.36	1.58	1.98	1.58	1.22	.99
1928	.69	.76	.65	.68			.72	.67	.63	.68	
1929	2.04	2.22	2.14	2.05	2.13						

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives. Average prices as shown are based on stock of U. S. No. 1 grade; they are simple averages of daily range of selling prices.

[1] Minneapolis-St. Paul freight rate. [2] Field run and partly graded.

TABLE 265.—*Potatoes: Average l. c. l. price per 100 pounds, to jobbers, at three markets, 1919-1929*

Market, and season beginning April [1]	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York:														
1919	6.25	4.29	4.37	3.43	3.39	2.79	2.57	2.63	3.09	4.23	4.49	5.49	7.58	7.19
1920	------	9.03	6.93	5.54	2.56	1.83	1.93	1.96	1.82	1.80	1.31	1.51	1.28	1.22
1921	4.41	4.18	1.90	2.23	2.90	2.11	2.09	1.92	2.07	2.33	2.18	2.03	1.79	1.58
1922	4.07	3.27	3.03	1.81	1.04	.95	.96	1.22	1.36	1.39	1.44	1.87	2.09	1.76
1923	7.24	4.13	3.08	3.08	2.57	1.49	1.85	1.67	1.59	1.96	2.01	1.96	2.12	1.73
1924	5.92	4.12	2.34	1.48	1.41	1.37	1.33	1.22	1.26	1.46	1.56	1.21	1.20	1.36
1925	4.03	3.34	2.83	3.18	2.83	2.43	3.23	4.09	4.20	4.61	4.57	4.67	5.64	4.10
1926	8.84	6.29	3.78	2.29	2.38	2.57	2.89	2.99	2.92	2.80	2.48	2.45	2.46	3.64
1927	4.15	4.50	4.03	2.07	1.83	2.11	2.26	2.26	2.17	2.25	2.64	2.95	2.68	1.94
1928	6.32	2.89	1.54	1.02	1.24	1.34	1.37	1.32	1.41	1.52	1.45	1.36	1.48	1.67
1929	4.13	3.71	2.30	2.80	3.27	3.04	3.14	3.08	3.05	------	------	------	------	------
Chicago:														
1919	6.40	5.32	4.33	4.18	[2] 3.99	[2] 2.73	[2] 2.40	[2] 2.90	3.83	5.54	4.80	6.00	[2] 6.98	[2] 7.40
1920	------	9.14	8.38	[2] 6.44	[2] 3.42	[2] 2.40	[2] 1.85	[2] 2.13	[2] 1.58	[2] 1.29	[2] 1.15	[2] 1.25	[2] .98	[2] .87
1921	4.83	4.50	[2] 2.42	[2] 2.33	[2] 3.11	[2] 2.65	[2] 2.00	[2] 1.75	[2] 1.83	[2] 1.98	[2] 1.96	[2] 1.80	[2] 1.69	[2] 1.70
1922	4.16	3.57	[2] 3.03	[2] 2.29	[2] 1.63	[2] 1.17	[2] 1.00	[2] 1.05	[2] .96	[2] 1.02	[2] 1.07	[2] 1.35	[2] 1.53	[2] 1.13
1923	------	4.80	[2] 3.15	[2] 2.76	[2] 2.18	[2] 1.70	[2] 1.14	[2] 1.24	[2] 1.27	[2] 1.58	[2] 1.71	[2] 1.75	[2] 1.79	[2] 1.50
1924	5.68	4.69	2.65	[2] 1.76	[2] 1.40	[2] 1.32	[2] .97	[2] 1.31	[2] 1.36	[2] 1.47	[2] 1.63	[2] 1.44	[2] .84	[2] 1.18
1925	4.75	3.90	[2] 2.96	[2] 3.28	[2] 2.68	[2] 2.00	[2] 2.67	[2] 3.47	[2] 3.64	[2] 4.08	[2] 3.81	[2] 4.04	[2] 4.62	[2] 3.23
1926	8.59	6.57	[2] 3.91	[2] 2.35	[2] 2.22	[2] 2.45	[2] 2.49	[2] 2.65	[2] 2.47	[2] 2.55	[2] 2.37	[2] 2.42	[2] 2.68	[2] 3.51
1927	4.52	[2] 4.48	[2] 4.65	[2] 2.30	[2] 2.02	[2] 1.82	[2] 1.60	[2] 1.60	[2] 1.55	[2] 1.63	[2] 1.84	[2] 2.36	[2] 1.88	[2] 1.43
1928	5.95	[2] 2.94	[2] 1.74	[2] 1.15	[2] 1.06	[2] 1.04	[2] 1.16	[2] 1.24	[2] 1.24	[2] 1.31	[2] 1.27	[2] 1.19	[2] 1.21	[2] 1.36
1929	3.94	[2] 4.04	[2] 2.71	[2] 2.78	[2] 2.45	[2] 2.64	[2] 2.62	[2] 2.57	[2] 2.54	------	------	------	------	------
Boston:														
1919	------	5.00	4.64	4.19	3.76	2.54	2.26	2.67	3.06	4.12	4.39	5.23	6.25	7.08
1920	------	9.18	7.97	6.13	3.02	2.17	2.20	2.36	1.95	1.78	1.39	1.41	1.16	.94
1921	4.82	4.76	2.36	2.63	3.29	2.22	1.87	1.90	1.88	2.31	2.03	1.80	1.51	1.36
1922	4.80	3.86	3.54	2.33	1.48	1.20	1.20	1.38	1.31	1.44	1.47	1.76	2.18	1.98
1923	------	5.14	3.57	3.64	3.21	2.04	1.72	1.66	1.61	1.93	1.93	1.86	1.93	1.92
1924	6.03	5.37	2.72	1.90	1.59	1.41	1.12	1.09	1.12	1.28	1.47	1.12	.99	1.17
1925	4.46	3.81	3.21	3.68	3.60	2.01	3.04	4.12	4.17	4.66	4.46	4.62	5.79	4.13
1926	7.73	6.51	4.24	2.47	2.87	2.21	2.66	2.95	2.82	2.77	2.48	2.42	2.37	3.44
1927	4.43	4.80	4.53	2.28	2.11	2.46	1.94	2.03	1.93	2.02	2.36	2.83	2.49	1.80
1928	------	3.28	1.84	1.19	1.40	1.26	1.15	1.15	1.15	1.27	1.24	1.16	1.24	1.56
1929	3.98	3.93	2.63	3.03	3.20	2.63	2.65	2.53	2.54	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of U. S. No. 1 grade; they are simple averages of daily range of selling prices. In some cases conversions were made from larger to smaller units or vice versa, in order to obtain comparability.

[1] Crop movement season extends from April of one year through May of the following year, with irregular quotations continuing through June and July.
[2] Car-lot sales.

TABLE 266.—*Potatoes, Maine and New York State: Average l. c. l. price per bushel to jobbers at New York, 1909-1929*

Season beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	65	56	56	56	58	54	49	40	39
1910	55	55	51	49	52	49	47	62	57
1911	81	79	90	95	112	114	128	138	125
1912	60	59	64	68	63	67	62	66	77
1913	74	69	71	70	80	83	81	85	85
1914	62	56	54	51	51	48	47	50	46
1915	------	78	76	90	122	121	123	114	112
1916	118	125	169	161	198	267	267	300	318
1917	120	162	137	139	166	147	114	111	82
1918	158	144	137	150	142	126	111	143	149
1919	151	137	157	179	231	264	333	428	417
1920	------	125	138	127	116	88	88	78	66
1921	137	116	125	123	143	135	125	112	90
1922	86	78	82	86	93	96	121	125	110
1923	146	113	106	105	120	120	117	119	117
1924	91	72	70	73	82	94	73	71	76
1925	128	176	228	242	261	262	268	338	241
1926	140	162	171	170	161	146	142	143	216
1927	111	120	121	118	124	139	166	148	114
1928	78	69	68	72	77	76	72	81	91
1929	164	167	162	158	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Friday or Saturday issues, New York Producers' Price Current, average of weekly range.

In earlier years New York "State" quotations were included in the general term "State and Western." Earlier data are available in 1925 Yearbook, p. 928, Table 276.

TABLE 267.—*Spinach for consumption, fresh, commercial crop: Acreage, production, price per bushel, by States, 1926-1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Arkansas	-------	450	960	500	-------	68	182	92	-----	0.70	0.80	0.75
California [1]	2,290	1,900	1,000	1,400	1,832	1,520	753	1,085	0.27	.30	.52	.40
Louisiana	5,100	6,430	6,900	6,930	1,392	1,061	738	1,074	.65	.34	.48	.48
Maryland	2,130	2,130	2,020	2,070	1,012	1,118	753	828	.43	.32	.36	.40
Missouri	1,200	1,200	1,290	1,310	432	432	470	367	.60	.68	.70	.65
New Jersey	2,600	2,600	5,000	5,300	806	715	1,625	1,473	.60	.78	.74	.66
North Carolina	-------	320	170	110	-------	80	48	28	-----	.67	.96	.75
South Carolina	2,000	900	600	780	632	164	180	140	.72	.85	.99	.79
Texas [1]	16,820	19,450	25,600	28,650	5,130	6,457	5,120	8,595	.48	.50	.45	.35
Virginia [1]	8,050	7,860	7,500	7,700	1,731	2,468	1,980	2,110	.73	.61	.81	.68
Washington	-------	290	310	330	-------	116	108	116	-----	.30	.36	.41
Total or average	40,190	43,530	51,350	55,080	12,967	14,199	11,957	15,908	.52	.50	.57	.45

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Crop season begins in November of previous year.

TABLE 268.—*Spinach for canning, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

State	Average				Production				Seasonal farm price per ton			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
California	9,590	10,300	12,340	15,790	46,000	51,500	65,400	90,000	16.15	14.50	16.02	15.35
Maryland	1,420	1,420	1,660	1,700	4,000	4,400	3,700	4,100	30.62	32.80	37.50	35.50
Total	11,010	11,720	14,000	17,490	50,000	55,900	69,100	94,100	17.30	15.94	17.18	16.24

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

TABLE 269.—*Spinach: Car-lot shipments, by State of origin, 1920–1929*

State	Crop-movement season [1]									
	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Missouri	5	132	53	46	103	113	100	33	100	27
Maryland [3]	292	393	603	798	725	619	846	670	749	628
Virginia	1,372	2,475	2,212	3,208	3,107	2,946	2,669	3,213	3,058	2,974
South Carolina	--------	--------	161	422	161	501	614	462	282	111
Texas	861	1,463	1,455	2,433	3,038	3,235	4,513	4,495	5,528	5,559
California	326	149	302	473	70	241	305	445	334	494
Washington [3]	4	19	13	23	40	123	121	145	155	153
Other States [3]	[4] 32	115	115	177	263	141	215	192	369	394
Total	2,892	4,746	4,914	7,580	7,507	7,919	9,383	9,655	10,575	10,340

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop-movement season extends from October of the preceding year through December of the year shown.
[2] Preliminary.
[3] Figures include shipments in January of succeeding crop year as follows: Maryland, 1922, 5 cars; 1923, 4 cars; Washington, 1925, 4 cars; New Jersey, 1923, 1 car.
[4] Includes 1 car from New Mexico in March, 1921.

TABLE 270.—*Sweetpotatoes: Acreage, production, and value, United States, 1909–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1	Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1	Farm value Dec. 1
	1,000 acres	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*		*1,000 acres*	*Bushels*	*1,000 bushels*	*Cents*	*1,000 dollars*
1909	*641*	*92.4*	*59,232*			1919	941	103.2	97,126	134.4	130,514
1909	641	90.1	57,764	68.5	39,585	1920	992	104.8	103,925	113.4	117,834
1910	641	93.5	59,938	67.1	40,216	1921	1,066	92.5	98,654	88.1	86,894
1911	605	90.1	54,538	75.5	41,202	1922	1,117	97.9	109,394	77.1	84,295
1912	583	95.2	55,479	72.6	40,264	1923	993	97.9	97,177	97.9	95,091
1913	625	94.5	59,057	72.6	42,884	1924	*467*	*80.2*	*37,444*		
1914	603	93.8	56,574	73.0	41,294	1924	688	78.4	53,912	128.8	69,444
1915	731	103.5	75,639	62.1	46,980	1925	779	80.0	62,319	136.4	85,034
1916	774	91.7	70,955	84.8	60,141	1926	819	101.0	82,703	95.5	78,956
1917	919	91.2	83,822	110.8	92,916	1927	933	100.9	94,112	82.5	77,615
1918	940	93.5	87,924	135.2	118,863	1928	810	95.9	77,661	91.5	71,096
1919	*804*	*97.2*	*78,092*			1929 [1]	822	103.0	84,661	94.5	80,015

Bureau of Agricultural Economics. Acreage, yield, and production figures are estimates of the crop-reporting board; italic figures are census returns. Prices are based upon returns from crop reporters.

[1] Preliminary.

TABLE 271.—*Sweetpotatoes: Acreage and production, by States, average 1923–1927, annual 1926–1929*

State	Acreage					Production				
	Average, 1923–1927	1926	1927	1928	1929 [1]	Average, 1923–1927	1926	1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*
New Jersey	16	17	15	15	15	2,105	2,465	1,890	2,175	2,100
Ohio	3	3	3	3	3	336	315	399	360	375
Indiana	2	3	2	2	2	271	330	224	232	250
Illinois	10	13	10	10	10	1,052	1,430	1,030	980	1,020
Iowa	3	3	3	3	3	285	309	270	369	315
Missouri	11	10	12	11	12	1,165	1,120	1,344	1,155	1,320
Kansas	3	4	3	2	2	386	516	408	260	240
Delaware	8	9	8	7	8	986	1,251	880	980	1,160
Maryland	10	11	11	10	10	1,370	1,815	1,584	1,500	1,250
Virginia	40	43	43	44	45	4,931	5,375	5,805	6,336	6,705
West Virginia	3	3	2	2	2	309	330	220	204	240
North Carolina	87	84	89	80	78	8,521	7,560	10,146	7,840	9,126
South Carolina	59	47	53	49	50	4,888	3,760	5,300	4,214	5,750
Georgia	118	110	132	119	124	8,740	9,460	10,560	10,234	11,780
Florida	28	28	29	28	29	2,595	2,800	2,668	2,464	3,190
Kentucky	16	17	16	14	15	1,562	2,040	1,488	1,246	1,365
Tennessee	40	50	48	41	44	4,159	6,150	4,704	3,895	4,400
Alabama	76	65	78	70	74	6,965	6,500	7,644	6,510	7,622
Mississippi	67	55	69	55	59	6,370	5,720	7,728	6,050	7,670
Arkansas	35	34	38	28	26	3,425	3,672	4,408	2,520	1,716
Louisiana	78	79	99	74	80	6,518	7,110	9,702	6,660	7,440
Oklahoma	23	24	23	20	15	2,221	2,520	2,438	1,780	990
Texas	93	92	133	109	104	7,506	8,556	11,970	8,284	7,384
New Mexico	1	1	1	1	1	126	135	102	119	123
Arizona	2	2	1	1	1	254	300	120	142	140
California	9	12	12	12	10	901	1,164	1,080	1,152	990
United States	842	819	933	810	822	78,045	82,703	94,112	77,661	84,661

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 272.—*Sweetpotatoes: Yield per acre and estimated price per bushel, December 1 by States, averages, and annual 1924–1929*

State	Yield per acre							Estimated price per bushel						
	Av., 1918–1927	1924	1925	1926	1927	1928	1929	Av., 1923–1927	1924	1925	1926	1927	1928	1929
	Bus.	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
New Jersey	132	140	117	145	126	145	140	156	155	240	120	120	120	140
Ohio	109	95	115	105	133	120	125	163	163	210	150	140	135	145
Indiana	115	115	108	110	112	116	125	147	142	190	145	135	130	135
Illinois	100	108	88	110	103	98	102	138	139	190	135	115	110	130
Iowa	90	80	109	103	90	123	105	184	190	230	200	150	155	170
Missouri	103	100	95	112	112	105	110	130	125	165	130	120	105	120
Kansas	115	113	116	129	136	130	120	135	135	170	135	110	110	135
Delaware	124	130	110	139	110	140	145	113	126	190	65	70	80	90
Maryland	136	140	129	165	144	150	125	111	127	170	75	70	80	90
Virginia	122	120	108	125	135	144	149	106	110	130	100	85	70	90
West Virginia	114	110	92	110	110	102	120	158	141	200	160	140	140	160
North Carolina	102	92	88	90	114	98	117	100	104	120	100	80	85	90
South Carolina	88	68	55	80	100	86	115	103	104	147	100	80	85	85
Georgia	81	70	47	86	80	86	95	91	100	125	80	75	85	80
Florida	93	84	85	100	92	88	110	119	130	140	125	85	115	105
Kentucky	100	80	90	120	93	89	91	126	128	153	108	120	115	120
Tennessee	102	95	90	123	98	95	100	107	140	140	70	85	95	95
Alabama	92	73	70	100	98	93	103	101	125	125	85	85	90	90
Mississippi	96	51	96	104	112	110	130	108	173	100	95	80	90	80
Arkansas	96	81	85	108	116	90	66	104	127	125	95	80	90	115
Louisiana	86	50	80	90	98	90	93	106	158	115	90	70	85	85
Oklahoma	95	87	94	105	106	89	66	116	150	135	100	80	95	115
Texas	83	57	73	93	90	76	71	117	158	142	95	75	100	105
New Mexico	123	120	140	135	102	119	123	170	255	165	100	130	145	175
Arizona	138	125	130	150	120	142	140	203	238	210	155	200	200	220
California	116	94	112	97	90	96	99	156	218	170	110	115	110	145
United States	95.0	78.4	80.0	101.0	100.9	95.9	103.0	108.2	128.8	136.4	95.5	82.5	91.5	94.5

Bureau of Agricultural Economics. Yield figures are estimates of the crop-reporting board. Prices are based upon returns from crop reporters.

TABLE 273.—*Sweetpotatoes: Car-lot shipments by State of origin, 1920–1928*

State	Crop movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New Jersey [3]	2,392	2,196	2,857	1,528	1,894	1,365	1,770	1,225	1,223
Indiana [3]	44	62	65	75	103	236	284	209	231
Delaware	1,877	1,722	2,632	1,549	1,750	1,742	1,885	1,517	1,470
Maryland	1,363	1,286	1,750	1,123	1,155	1,520	2,283	2,256	2,106
Virginia [3]	4,839	5,300	6,633	5,374	5,213	4,750	6,501	6,618	6,478
North Carolina [3]	823	1,022	680	563	816	1,489	1,683	1,711	746
South Carolina [3]	56	135	236	154	120	231	162	276	130
Georgia [3]	1,030	1,400	781	610	1,018	674	678	667	227
Florida	95	112	123	[4] 62	175	242	185	159	69
Kentucky [3]	12	85	55	30	31	90	302	185	121
Tennessee [3]	924	1,578	1,495	726	1,137	2,592	4,972	3,587	2,918
Alabama	579	591	537	382	649	663	515	574	393
Mississippi	93	181	116	62	36	156	79	211	126
Arkansas [3]	568	584	240	263	371	476	548	392	316
Louisiana [3]	772	893	1,033	463	558	2,340	1,285	1,147	983
Oklahoma	91	147	85	110	107	216	268	294	255
Texas	632	759	974	535	221	474	702	1,284	716
California	856	1,000	982	684	466	1,161	1,186	805	767
Other States [3]	160	332	288	240	247	419	467	306	257
Total [3]	17,206	19,385	21,562	14,533	16,067	20,836	25,755	23,423	19,532

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from July 1 of 1 year through June of the following year.
[2] Preliminary.
[3] Figures for certain States include shipments in July of succeeding crop year as follows: New Jersey, 1920, 15 cars, 1922, 3 cars; Indiana, 1926, 1 car; Virginia, 1928, 1 car; North Carolina, 1926, 3 cars, 1927, 10 cars; South Carolina, 1922, 1 car; Georgia, 1927, 2 cars; Kentucky, 1921, 1 car, 1926, 12 cars, 1928, 5 cars; Tennessee, 1921, 17 cars, 1921, 3 cars; 1925, 11 cars, 1926, 309 cars, 1927, 6 cars, 1928, 137 cars; Arkansas, 1921, 1 car, 1926, 1 car; Louisiana, 1926, 1 car; New Mexico, 1921, 5 cars; Tennessee, 1926, 19 cars in August.
[4] Includes 3 cars in June 1923

Table 274.—*Sweetpotatoes: Estimated average price per bushel received by producers, United States, 1910–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
Average:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	73.5	82.9	79.5	75.7	67.8	70.9	79.1	81.6	87.3	95.0	103.6	93.8	78.7
1911	104.1	107.4	97.9	85.6	76.2	79.0	86.9	93.5	102.4	117.4	118.6	111.4	92.2
1912	113.0	102.5	88.9	79.9	73.7	77.2	83.7	87.0	90.8	94.3	93.2	90.8	85.6
1913	89.4	98.8	89.8	78.0	73.4	75.8	82.5	86.1	87.3	91.9	92.7	92.5	84.0
1914	94.5	98.4	90.1	79.3	72.3	74.9	81.0	85.0	90.8	100.8	98.1	97.6	84.6
1915	93.1	97.2	80.0	69.7	62.9	65.0	72.7	76.4	80.1	81.0	78.9	83.9	75.4
1916	87.5	99.0	88.1	80.3	80.3	86.4	92.9	100.0	115.5	126.0	132.6	135.8	92.9
1917	124.4	126.3	120.3	110.5	105.6	110.8	123.1	129.8	149.2	158.1	158.2	134.0	122.3
1918	142.1	151.6	164.3	152.4	137.4	131.8	137.8	149.2	157.2	176.2	174.4	162.7	150.0
1919	159.7	195.4	174.6	150.9	135.1	135.6	151.1	163.6	179.2	193.9	199.7	205.2	161.7
1920	200.7	210.8	190.0	138.7	116.5	112.3	126.3	122.1	125.5	135.7	136.8	141.9	144.8
1921	151.2	154.2	118.2	104.0	91.5	95.3	102.3	106.9	114.3	116.0	117.1	120.7	110.9
1922	125.3	127.5	106.0	90.4	79.0	84.8	92.5	96.9	100.1	103.8	107.9	107.4	97.4
1923	112.1	151.3	133.6	114.8	101.0	103.8	112.5	123.7	129.0	140.4	139.2	138.9	121.7
1924	130.7	151.4	157.0	145.1	130.3	140.1	145.5	160.2	180.8	196.2	189.1	170.2	152.4
1925	188.7	196.3	177.4	169.4	144.4	141.5	149.3	162.4	171.4	180.4	192.2	198.8	165.9
1926	185.6	189.0	153.9	110.6	88.5	94.0	97.8	109.0	112.3	112.8	118.9	136.0	120.3
1927	136.4	146.7	121.9	98.1	86.5	91.9	93.4	98.6	109.6	115.1	121.4	124.7	106.5
1928	119.5	131.0	120.9	111.2	100.2	101.8	104.2	113.7	117.0	120.8	125.9	129.8	113.1
1929	135.9	136.2	127.9	112.5	97.7	98.9							

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of sweetpotatoes for each State, yearly price obtained by weighting monthly prices by average monthly marketings.

Table 275.—*Sweetpotatoes: Average l. c. l. price per bushel to jobbers, New York and Chicago, 1919–1929*

Market, and season beginning August	Aug.[1]	Sept.[1]	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.[2]	May[2]
New York:	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1919			1.34	1.48	2.12	2.41	2.65	2.48	3.16	4.15
1920	2.70	1.76	1.36	1.23	1.56	1.76	1.82	2.40	2.32	2.73
1921	1.51	1.48	1.26	1.36	1.67	2.02	1.93	1.92	2.27	2.23
1922		1.00	.70	.73	.96	1.03	1.01	.94	1.39	
1923		1.16	1.20	1.95	2.51	2.94	3.38	3.62	3.98	
1924		1.98	1.47	1.88	2.47	2.75	2.74	2.63		
1925	1.53	1.70	1.68	1.70	2.23	2.61	2.59	2.96	3.42	
1926	2.21	1.47	.97	.98	1.24	1.37	1.46	1.61	1.81	2.09
1927	1.31	1.13	.93	1.29	1.48	1.66	1.88	2.08	2.04	
1928	1.57	1.29	1.05	1.31	1.62	1.88	2.14	2.32		
1929	1.60	1.34	1.09	1.28	1.60					
Chicago:										
1919			1.55	1.78	2.00	2.29	2.27	1.94	2.45	3.35
1920	2.61	2.05	1.85	1.96	2.21	2.20	2.29	2.35	2.40	2.13
1921	2.01	1.70	1.57	1.48	1.65	1.81	1.89	1.93	1.69	1.29
1922		1.44	1.00	1.22	1.26	1.43	1.44	1.47	1.62	
1923		1.67	1.52	2.03	2.73	3.09	3.31	3.76	4.04	
1924		2.29	1.88	2.33	2.80	2.92	3.26	2.94		
1925	2.04	2.04	2.02	2.25	2.42	2.37	2.29	2.40	2.98	
1926	2.23	1.72	1.30	1.37	1.69	1.70	1.66	1.52	1.23	1.44
1927	1.54	1.55	1.39	1.44	[3] 1.68	[3] 2.16	[3] 2.51	[3] 2.09	[3] 2.22	
1928	2.01	1.69	1.46	1.92	[3] 2.30	[3] 2.40	[3] 2.49	[3] 2.37		
1929	1.76	1.83	1.57	[3] 1.64	1.78					

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets.

Average prices as shown are based on stock of good merchantable quality and condition; they are simple averages of daily range of selling prices. In some cases conversions have been made from larger to smaller units or vice versa, in order to obtain comparability.

[1] Commodity reports began Sept. 30, 1919, Aug. 23, 1920 and 1921, Sept. 1, 1922, Sept. 18, 1923, Sept. 2, 1924 Aug. 25, 1925, Aug. 16, 1926, Aug. 19, 1927, Aug. 22, 1928, Aug. 19, 1929.

[2] Last commodity report of season May 28, 1920, May 26, 1921 and 1922, May 4, 1923, Apr. 15, 1924, Apr. 3, 1925, Apr. 16, 1926, Apr. 19, 1927, Apr. 3, 1928, Apr. 5, 1929. Subsequent prices for 1927 taken from miscellaneous reports.

[3] Kiln-dried.

TABLE 276.—*Tomatoes for consumption, fresh, commercial crop: Acreage production, and price per bushel, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per bushel			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Fall:												
Florida			400	4,000			20	240			3.55	3.00
Texas	950	800	800	1,400	62	57	54	112	2.72	2.50	1.93	1.92
Total	950	800	1,200	5,400	62	57	74	352	2.72	2.50	2.36	2.66
Early:												
California (Imperial)	1,000	1,300	1,200	1,400	113	95	146	134	3.05	2.00	2.06	1.85
Florida—												
East Coast South	5,560	13,500	12,720	16,750	723	1,958	1,565	1,508	4.82	2.00	3.54	3.00
Other	15,140	16,300	16,140	16,230	1,226	1,646	1,501	1,217	4.07	2.03	3.54	3.00
Texas (Lower Vy.)	3,300	6,500	7,310	8,000	360	344	731	680	3.27	1.90	2.40	1.53
Total	25,000	37,600	37,370	42,380	2,422	4,043	3,943	3,539	4.13	2.00	3.27	2.67
Second early:												
Georgia	1,850	2,090	2,090	210	111	163	142	27	2.50	1.36	1.76	2.30
Louisiana	1,690	1,980	1,690	1,770	128	178	166	158	1.81	1.00	1.27	1.25
Mississippi	14,200	15,360	16,800	14,800	1,406	1,997	1.344	1,658	3.28	2.40	1.75	2.10
South Carolina	3,450	2,000	2,600	2,860	386	160	322	429	3.33	1.51	1.87	2.48
Texas (other)	9,680	9,580	11,210	11,200	910	1,207	1,099	1,176	2.63	1.66	1.55	2.22
Total	30,870	31,010	34,390	30,840	2,941	3,705	3,073	3,448	2.99	2.01	1,67	2.15
Intermediate:												
Arkansas	1,180	2,730	3,280	2,950	132	303	341	236	1.26	2.24	.94	1.96
Illinois (Union Co.)	1,300	940	1,010	1,060	65	150	91	91	1.18	2.04	1.31	2.40
Maryland	3,220	4,000	4,700	5,000	206	628	451	950	.91	.80	.84	1.15
Missouri	1,080	4,480	4,480	4,440	89	318	291	511	.86	.61	.71	1.69
New Jersey	12,000	11,400	11,500	11,850	2,520	2,508	2,012	2,429	.95	1.10	1.18	1.13
Ohio (Wash. Co.)	920	920	970	900	166	222	174	238	1.69	1.35	1.75	2.67
Tennessee	8,000	6,600	9,000	7,500	936	825	1,098	938	1.99	2.76	1.17	2.40
Virginia	1,500	1,200	1,360	1,500	188	150	196	255	.63	2.25	1.93	1.05
Total	29,200	32,270	36,300	35,200	4,302	5,104	4,654	5,648	1.20	1.44	1.15	1.50
Late:												
California (other)	12,090	21,550	20,650	18,950	2,007	1,789	1,735	1,421	1.19	1.16	1.32	1.15
Colorado	410	800	600	600	110	160	158	108	.76	.85	.91	.97
Delaware	200	180	160	190	20	36	14	36	1.00	.75	.72	.54
Illinois (other)	2,260	2,750	2,750	2,890	396	432	336	332	.99	1.51	.74	.85
Indiana	4,350	4,780	4,970	5,370	592	650	537	698	.67	.60	.67	.76
Iowa	570	450	190	220	67	72	24	31	.50	.51	.83	.98
Kentucky	1,040	1,630	1,710	1,620	115	186	130	224	1.39	1.18	.82	.90
Michigan	290	290	290	340	51	57	61	58	1.33	.91	.98	1.26
New York	1,740	2,640	2,640	2,900	311	631	560	667	.85	.56	.99	1.05
Ohio (other)	890	1,110	840	880	152	179	176	163	1.16	.78	.93	1.15
Oregon			200	250			40	50			1.60	1.50
Pennsylvania	370	420	450	450	40	75	58	99	.59	.60	.92	1.02
Utah	700	500	600	650	105	100	138	170	.75	.78	.67	.67
Total	24,910	37,100	36,050	35,310	3,966	4,367	3,967	4,057	1.03	.96	1.05	1.00
Total	110,930	138,780	145,310	149,130	13,693	17,276	15,711	17,044	2.06	1.58	1.77	.178

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 277.—*Tomatoes for manufacture, commercial crop: Acreage, production, and price per ton, by States, 1926–1929*

Group and State	Acreage				Production				Price per unit of production			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Tons*	*Tons*	*Tons*	*Tons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	9,850	10,540	12,500	13,600	49,200	70,600	73,800	85,700	15.30	14.92	15.20	15.70
New Jersey	32,000	30,000	33,000	33,000	153,600	156,000	118,800	214,500	20.40	18.00	18.50	19.00
Pennsylvania	3,370	3,740	3,600	3,420	10,100	18,700	13,000	13,700	13.40	14.24	14.50	15.00
Ohio	8,000	10,000	10,400	10,950	38,400	45,000	60,300	52,600	11.20	12.45	11.60	12.00
Indiana	49,990	42,990	49,870	59,840	175,000	163,400	149,600	251,300	12.60	13.06	12.90	13.20
Illinois	5,270	5,110	5,130	5,440	21,100	22,500	17,400	20,700	13.44	13.98	13.00	13.00
Michigan	1,800	1,800	1,660	1,990	9,000	9,900	9,600	9,000	11.80	12.13	11.00	12.00
Iowa	3,850	4,080	4,810	4,570	12,700	18,400	16,800	25,100	12.88	14.29	13.00	13.00
Missouri	25,620	19,440	18,700	20,940	64,000	38,900	33,700	60,700	11.85	12.87	12.60	13.00
Delaware	11,700	15,000	13,500	13,500	23,400	76,500	32,400	68,800	20.00	14.00	17.00	17.00
Maryland	37,000	34,410	23,910	27,500	88,800	151,400	66,900	140,200	13.90	14.28	15.70	16.10
Virginia	6,000	6,420	6,000	6,840	21,000	25,700	14,400	26,000	12.73	13.75	13.20	14.90
Kentucky	6,950	6,530	5,500	6,820	20,800	20,900	11,600	26,600	12.25	13.08	12.60	12.60
Tennessee	8,200	8,450	10,220	9,200	24,600	24,500	18,400	23,000	13.42	13.95	12.00	12.10
Arkansas	11,630	17,820	19,600	22,600	29,100	53,500	43,100	61,000	11.86	12.76	12.60	14.00
Colorado	2,350	2,000	1,600	1,920	17,600	14,000	11,800	16,700	12.00	12.00	11.00	11.00
Utah	2,630	5,200	5,650	6,180	18,400	48,400	65,500	56,900	10.00	11.00	11.00	11.00
California	32,250	28,760	24,700	32,450	206,400	178,300	182,800	201,200	15.61	15.00	14.60	15.20
Other States	3,040	3,310	4,070	4,480	9,100	7,600	14,200	15,200	13.60	14.43	13.20	13.40
Total	261,500	255,600	254,402	285,240	992,300	1,144,200	954,100	1,368,900	14.72	14.32	14.17	14.92

Bureau of Agricultural Economics. Estimates based upon returns from canning establishments.

TABLE 278.—*Tomatoes: Car-lot shipments by State of origin, 1920–1929*

State	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929 [1]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	1,945	1,073	1,902	1,261	954	1,024	656	951	1,112	829
New Jersey	2,798	2,121	1,930	1,648	2,150	1,907	2,006	1,329	678	662
Ohio	450	411	558	956	1,035	1,286	1,065	1,125	926	995
Indiana	1,265	552	1,332	1,185	1,479	1,889	1,514	1,132	799	1,601
Illinois	450	155	229	250	230	539	422	270	240	232
Maryland	194	110	242	271	66	313	259	586	613	695
Virginia	188	91	83	44	167	379	454	360	277	488
South Carolina	--------	59	145	431	421	568	449	187	161	348
Georgia	1	4	23	18	176	85	169	82	73	62
Florida [2]	4,192	5,785	10,245	9,760	9,140	7,188	4,351	9,737	8,491	8,038
Kentucky	468	341	153	121	546	498	300	203	42	244
Arkansas	11	23	47	9	38	104	281	240	389	298
Tennessee	805	370	920	501	985	1,393	2,374	2,016	2,759	2,317
Mississippi	1,393	1,945	3,441	2,144	3,776	3,149	3,492	4,849	3,230	4,099
Texas [3]	1,393	2,025	1,893	1,084	1,694	2,398	2,890	3,393	4,435	5,317
Utah	261	100	378	369	380	1,457	272	883	899	682
California [3]	2,004	1,819	2,349	3,293	2,789	2,961	4,440	4,620	4,475	4,211
Other States	576	431	847	622	804	1,116	674	701	796	783
Total [2 3]	18,394	17,415	26,717	23,967	26,830	28,254	26,068	32,664	30,395	31,901

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Preliminary.

[2] Figures for Florida include cars moved in preceding calendar year as follows: 1920, 14 cars in November, 34 cars in December; 1922, 10 cars in December; 1923, 26 cars in December; 1924, 2 cars in November, 55 cars in December; 1925, 14 cars in November, 31 cars in December; 1926, 7 cars in November, 13 cars in December; 1927, 1 car in December; 1928, 28 cars in November, 291 cars in December; 1929, 104 cars in November, 392 cars in December.

[3] Figures include cars in following calendar year as follows: California, 1922, 3 cars in January; 1924, 1 car in January; 1925, 1 car in January; 1928, 1 car in January; Texas, 1922, 5 cars in January, and 2 cars in February; 1925, 8 cars in January; 1926, 15 cars in January; 1927, 1 car in January; 1928, 1 car in January.

TABLE 279.—*Tomatoes: United States commercial production, imports and exports, annual, 1923–1929*

Year	Commercial production		Imports, year beginning July 1				Exports, year beginning July 1	
	For table	For manufacture	Fresh	Canned	Otherwise prepared	Paste	Canned	Catsup and sauces
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1923	973, 200	2, 244, 800	[1] 50, 838	30, 946	[1] 1, 341	[1] 4, 164	9, 152	[1] 3, 560
1924	1, 057, 000	2, 317, 000	69, 216	73, 902	9, 443	17, 382	5, 203	5, 520
1925	1, 098, 800	3, 544, 400	82, 448	84, 897	(2)	18, 179	5, 794	5, 006
1926	767, 000	1, 984, 600	124, 489	80, 257		15, 642	7, 504	7, 556
1927	967, 600	2, 288, 400	113, 357	107, 782		12, 064	6, 725	8, 584
1928	875, 200	1, 917, 000	128, 606	8, 952		9, 539	4, 009	13, 066
1929								

Bureau of Agricultural Economics. Production figures based upon returns from crop reporters; imports and exports compiled from Monthly Summary of Foreign Commerce of the United States, June issues.

[1] January–June, 1924.
[2] From 1926 on included with "tomatoes, canned."

TABLE 280.—*Tomatoes, canned: Pack [1] in the United States, 1917–1929*

State	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
New York	553	396	437	515	214	340	266	325	389	302	300	261	329
New Jersey	380	667	60	517	116	337	412	186	418	204	254	95	257
Pennsylvania	[2] 488	[2] 441	[2] 384	[2] 680	[2] 186	[2] 644	258	150	338	118	167	95	122
Ohio	107	357	172	142	71	179	174	133	179	120	189	124	153
Indiana	398	968	876	778	530	1, 312	717	1, 050	1, 955	900	1, 131	613	1, 134
Missouri	704	353	439	715	136	775	839	871	1, 836	895	605	396	622
Delaware	1, 381	879	189	553	176	590	1, 216	803	1, 272	228	827	325	851
Maryland	5, 934	6, 649	2, 529	3, 347	1, 656	3, 205	5, 722	3, 825	6, 175	1, 901	3, 671	1, 720	4, 050
Virginia [3]	1, 170	1, 547	953	1, 162	217	891	963	1, 116	1, 138	572	1, 059	466	918
Kentucky [2]							59	136	275	223	253	111	167
Tennessee [2]							176	386	382	280	368	160	297
Arkansas [4]							270	768	1, 168	558	678	613	769
Colorado [5]	213	306	290	218	62	168	182	180	309	183	127	158	195
Utah	513	953	594	444	132	664	584	417	1, 353	235	792	924	768
California	2, 603	1, 790	3, 052	1, 773	339	1, 701	2, 397	1, 767	1, 839	2, 347	2, 257	1, 991	2, 812
Other States	632	576	835	524	182	732	437	406	744	389	459	487	701
United States	15, 076	15, 882	10, 810	11, 368	4, 017	11, 538	14, 672	12, 519	19, 770	9, 455	13, 137	8, 539	14, 145

Bureau of Agricultural Economics. Compiled from National Canners' Association, 1917–1926; Census of Manufactures 1927–1928; 1929, American Grocer, Feb. 19, 1930.

[1] Stated in cases of 24 No. 3 cans.
[2] Previous to 1923, Pennsylvania, Kentucky, and Tennessee composed one group.
[3] Includes West Virginia.
[4] Previous to 1923, included in "Other States."
[5] Includes Washington.

TABLE 281.—*Watermelons, commercial crop: Acreage, production, and price per 1,000 melons, by States, 1926–1929*

State	Acreage				Production				Seasonal farm price per 1,000 melons			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*1,000 melons*	*1,000 melons*	*1,000 melons*	*1,000 melons*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Early:												
California (Imperial)	6,000	5,500	8,000	8,900	4,560	3,597	4,912	6,319	100	120	138	143
Florida	24,150	29,420	37,840	36,390	10,843	8,826	10,406	10,480	255	286	299	278
Total	30,150	34,920	45,840	45,290	15,403	12,423	15,318	16,799	209	238	253	227
Second Early:												
Alabama	11,030	9,820	9,330	7,460	3,254	2,946	2,332	2,387	93	175	151	93
Arizona	1,200	1,200	1,150	1,250	402	420	391	400	156	287	250	200
Georgia	53,600	55,220	62,950	9,240	20,958	17,946	18,885	23,542	121	161	141	150
Mississippi	1,240	1,300	1,400	1,330	217	390	392	466	89	140	150	162
North Carolina	4,880	5,610	5,610	5,440	1,484	2,014	1,683	979	77	149	136	175
South Carolina	12,720	12,470	14,340	11,330	5,215	4,240	4,302	3,739	88	168	94	175
Texas	34,900	29,660	35,080	29,640	6,980	8,156	8,770	5,335	222	165	186	156
Total	119,570	115,280	129,860	125,690	38,510	36,112	36,755	36,848	131	164	148	151
Late:												
Arkansas	2,700	2,200	2,700	2,190	540	594	810	815	121	186	135	172
California, (other)	6,820	4,280	4,400	5,020	3,008	1,644	3,379	3,785	112	139	133	115
Colorado	300	700	570	500	108	105	182	150	95	242	150	165
Delaware	2,000	980	880	740	800	98	132	222	105	105	158	200
Illinois	3,200	2,880	3,170	3,800	816	734	824	1,330	86	269	162	190
Indiana	3,440	2,720	3,240	3,200	980	778	1,134	2,342	118	350	146	180
Iowa	1,640	1,380	1,610	1,580	420	442	523	291	84	218	157	165
Maryland	1,800	1,240	1,180	1,000	648	446	401	275	76	200	125	177
Missouri	17,500	8,000	5,000	5,700	5,688	1,800	1,430	1,550	114	201	154	173
New Jersey	2,200	1,900	2,000	2,200	462	380	500	1,100	210	250	270	300
Oklahoma	4,000	3,000	3,270	3,110	1,300	1,146	818	871	186	175	155	175
Virginia	3,100	2,320	2,320	2,440	781	731	784	878	141	144	165	179
Washington	640	710	890	1,100	234	249	305	360	118	225	202	319
Total	49,340	32,310	31,230	32,580	15,785	9,147	11,222	13,969	120	202	152	175
Grand total	199,060	182,510	206,930	203,560	69,698	57,682	63,295	67,616	146	186	174	175

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

TABLE 282.—*Watermelons: Car-lot shipments by State of origin, 1928–1929*

State and year	Crop movement season [1]									
	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Florida:										
1928		272	5, 964	2, 942	17					9, 195
1929 [2]	36	3, 353	6, 982	106						10, 477
California:										
1928		233	2, 171	2, 491	490	186	18			5, 589
1929 [2]		23	2, 032	2, 980	1, 121	185	21			6, 362
Texas:										
1928			2, 135	3, 072	1, 216	25	2			6, 450
1929 [2]		120	1, 898	1, 674	731	32				4, 455
Georgia:										
1928			81	12, 583	4, 824	70				17, 558
1929 [2]			10, 606	9, 500	1, 691	40				21, 837
Alabama:										
1928			2	510	193	64				769
1929 [2]			230	303	133	59				725
South Carolina:										
1928				3, 011	810	1				3, 822
1929 [2]			162	2, 997	174	4				3, 337
North Carolina:										
1928				126	1, 126					1, 252
1929 [2]				138	601					739
Missouri:										
1928					738	113				851
1929 [2]				12	938	140				1, 090
Other States:										
1928		3	57	202	1, 994	724	30	1		3, 011
1929 [2]			109	416	2, 135	558	9			3, 227
Total:										
1920		17	5, 475	18, 057	11, 401	2, 230	49	22	63	37, 314
1921	7	1, 133	11, 061	19, 229	12, 256	1, 983	80			45, 749
1922	8	3, 566	15, 291	18, 003	9, 061	1, 616	80			47, 625
1923	3	762	6, 176	15, 351	8, 583	2, 045	159	2		33, 081
1924	[3] 2	65	6, 602	26, 024	10, 470	2, 458	120	4		45, 745
1925		605	11, 767	17, 814	11, 524	2, 390	82	2		44, 184
1926		443	11, 424	29, 873	11, 497	1, 861	28			55, 126
1927	4	1, 713	15, 255	20, 898	6, 262	1, 261	67			45, 460
1928		508	10, 410	24, 937	11, 408	1, 183	50	1		48, 497
1929 [2]	36	3, 496	22, 019	18, 126	7, 524	1, 018	30			52, 249

Bureau of Agricultural Economics. Compiled from daily and monthly reports received by the bureau from officials and local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis. See 1927 Yearbook, p. 901, for data for earlier years.

[1] Crop movement season extends from Apr. 1 through December of a given year.
[2] Preliminary.
[3] Reported as shipped in January.

TABLE 283.—*Watermelons, Tom Watson: Price per car to jobbers, Chicago and New York, 1924–1929* [1]

Market and season [2]	June	July	August	Market and season [2]	June	July	August
Chicago:	*Dollars*	*Dollars*	*Dollars*	New York:	*Dollars*	*Dollars*	*Dollars*
1924	576. 00	249. 00	291. 00	1924	474. 00	[3] 270. 00	[3] 273. 00
1925	576. 00	362. 00	[4] 211. 00	1925	[3] 512. 00	[3] 311. 00	202. 00
1926	623. 00	281. 00	[4] 202. 00	1926	460. 00	248. 00	180. 00
1927	471. 00	289. 00		1927	435. 00	289. 00	237. 00
1928	445. 00	301. 00	252. 00	1928	378. 00	262. 00	216. 00
1929	365. 00	339. 00		1929	368. 00	278. 00	[4] 234. 00

Bureau of Agricultural Economics. Compiled from daily market reports from bureau representatives in the various markets. Average prices as shown are based on stock of good merchantable quality and condition; they are simply averages of daily range of selling prices.

[1] Quotations are for Southeastern, 22–26 pound average.
[2] Quotations began June 6, 1924; May 28, 1925; May 28, 1926; May 16, 1927; May 21, 1928; May 9, 1929. Last reported quotations of season Aug. 30, 1924; Sept. 5, 1925; Sept. 1, 1926; Aug. 26, 1927; Aug. 24, 1928; Aug. 31, 1929.
[3] Auction sales.
[4] Thurmond Gray.

TABLE 284.—*Truck crops, commercial (for consumption, fresh, and for canning and manufacture):*[1] *Total acreage and value, by States, average 1923–1927, annual 1928 and 1929*

State	Acreage			Farm value [2]		
	Average 1923–1927	1928	1929	Average 1923–1927	1928	1929
	Acres	*Acres*	*Acres*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	14, 860	12, 840	17, 580	1, 226	952	1, 411
New Hampshire	1, 090	1, 110	1, 320	68	62	79
Vermont	2, 400	1, 940	2, 370	114	86	113
Massachuetts	3, 890	5. 080	4, 310	1, 350	1, 350	1, 371
New York	151, 030	151, 110	158, 940	21, 285	21, 640	21, 855
New Jersey	143, 360	159, 020	154, 840	25, 067	21, 004	27, 594
Pennsylvania	17, 540	17, 350	17, 710	2, 551	2, 390	2, 198
North Atlantic	334, 170	348, 450	357, 070	51, 661	47, 484	54, 621
Ohio	58, 670	60, 610	63, 490	5, 890	5, 077	5, 089
Indiana	116, 430	118, 770	130, 230	8, 177	8, 277	8, 216
Illinois	89, 160	93, 300	100, 320	5, 976	4, 731	5, 316
Michigan	74, 040	65, 590	66, 270	6, 162	7, 250	6, 642
Wisconsin	147, 970	147, 600	163, 250	9, 249	10, 805	10, 724
Minnesota	37, 930	48, 720	65, 810	1, 523	2, 550	2, 636
Iowa	65, 040	54, 480	58, 020	3, 446	2, 691	3, 179
Missouri	64, 350	64, 570	61, 110	6, 100	4, 885	6, 127
Nebraska	8, 820	7, 370	7, 490	340	234	423
Kansas	17, 800	19, 570	14, 300	2, 243	993	1, 800
North Central	680, 200	680, 580	730, 290	49, 105	47, 493	50, 152
Delaware	34, 690	33, 050	33, 120	3, 638	2, 616	3, 964
Maryland	138, 380	131, 530	135, 790	14, 066	8, 200	13, 624
Virginia	138, 230	136, 580	123, 960	23, 031	14, 478	21, 487
North Carolina	53, 030	79, 430	53, 890	9, 837	7, 970	8, 237
South Carolina	54, 110	68, 150	56, 420	9, 229	6, 549	9, 107
Georgia	61, 700	81, 780	86, 590	4, 084	4, 033	5, 221
Florida	134, 110	159, 240	156, 860	36, 417	37, 480	36, 051
South Atlantic	614, 250	689, 760	646, 630	100, 303	81, 326	97, 691
Kentucky	21, 500	22, 330	19, 710	3, 046	2, 060	2, 725
Tennessee	37, 370	49, 760	45, 830	5, 867	4, 689	5, 650
Alabama	30, 880	38, 490	28, 010	3, 702	4, 593	3, 635
Mississippi	29, 130	35, 810	33, 360	6, 017	4, 636	5, 371
Arkansas	45, 160	66, 550	61, 710	5, 138	4, 543	5, 401
Louisiana	63, 480	102, 250	97, 510	10, 835	15, 306	15, 039
Oklahoma	16, 020	22, 320	17, 510	1, 949	784	1, 408
Texas	109, 390	163, 110	163, 300	15, 465	18, 409	19, 024
South Central	352, 930	500, 620	466, 940	52, 020	55, 020	58, 253
Montana		3, 500	4, 200		189	195
Idaho	2, 730	1, 360	1, 540	587	931	444
Wyoming	190	40	40	53	5	4
Colorado	40, 610	45, 030	57, 420	6, 725	7, 193	8, 593
New Mexico	3, 300	2, 330	2, 500	712	446	357
Arizona	15, 150	37, 850	40, 850	4, 041	6, 907	10, 418
Utah	16, 590	21, 510	23, 960	1, 911	3, 053	2, 532
Nevada	830	420	380	139	91	119
Washington	14, 230	19, 160	20, 620	3, 928	4, 813	5, 028
Oregon	12, 520	15, 380	16, 410	2, 923	3, 872	3, 424
California	270, 090	356, 620	387, 050	59, 450	72, 162	76, 751
Far Western	376, 240	503, 200	554, 970	80, 470	99, 662	107, 865
Miscellaneous [3]	22, 700	20, 470	22, 500	1, 238	979	1, 154
United States	2, 380, 488	2, 743, 080	2, 778, 400	334, 825	331, 964	369, 736

Bureau of Agricultural Economics.

[1] Crops grown for consumption, fresh: Asparagus, snap beans, cabbage, cantaloupes, carrots, cauliflowers, celery, cucumbers, eggplant, lettuce, onions, green peas, peppers, early Irish potatoes, spinach, strawberries, tomatoes, watermelons; and those grown for canning and manufacture; asparagus, snap beans, cabbage (kraut), sweet corn, cucumbers (pickles), green peas, pimientos (since 1926), spinach, tomatoes.
[2] Based upon average seasonal farm prices.
[3] Consists of minor acreages of canning crops in various States.

TABLE 285.—*Truck crops, commercial (for consumption, fresh, and for canning and manufacture): Acreage, production and value of specified crops, United States, 1923–1929*

ACREAGE

Crop	1923	1924	1925	1926	1927	1928	1929
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Asparagus	42,050	50,560	65,530	84,980	90,500	96,710	98,900
Beans, snap	61,420	88,020	107,170	100,460	110,220	134,370	134,420
Cabbage	104,880	119,120	119,970	129,330	143,790	137,170	157,220
Cantaloupes	84,160	95,250	93,260	101,690	105,780	100,660	106,730
Carrots	9,570	11,480	15,760	19,000	26,300	27,540	30,570
Cauliflower	11,700	13,100	15,780	22,170	18,020	21,430	25,360
Celery	20,660	22,550	22,910	21,830	24,550	27,040	28,730
Corn, sweet	252,590	302,790	393,910	317,310	223,350	305,960	331,070
Cucumbers	91,960	122,560	140,480	110,450	93,500	110,020	111,540
Eggplant	2,470	2,690	3,490	3,260	3,090	3,890	3,630
Lettuce	57,790	68,660	86,030	105,560	123,010	124,630	141,430
Onions	61,940	65,090	65,280	75,780	77,580	80,020	86,570
Peas, green	212,250	254,270	260,310	261,840	221,000	266,600	296,810
Peppers	8,210	11,190	13,780	15,560	14,770	17,890	17,810
Pimientos	----------	----------	----------	5,110	7,040	8,850	9,060
Potatoes, early	281,740	338,450	302,780	323,800	348,230	401,370	289,490
Spinach	31,070	34,140	44,360	51,200	55,250	65,350	72,570
Strawberries	148,360	176,470	144,740	152,040	191,250	206,920	198,560
Tomatoes	379,280	441,790	483,750	372,430	394,380	399,730	434,370
Watermelons	157,350	184,830	173,710	199,060	182,510	206,930	203,560
Total	2,019,450	2,403,010	2,553,000	2,472,860	2,454,120	2,743,080	2,778,400

PRODUCTION

Crop	1923	1924	1925	1926	1927	1928	1929
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Asparagus ..... crates	5,846	5,524	6,276	7,813	7,861	9,433	9,887
Beans, snap ..... tons	100	118	152	120	125	146	167
Cabbage ..... do	806	1,068	937	1,036	1,221	984	1,069
Cantaloupes ..... crates	11,745	13,834	14,553	14,393	15,014	15,416	16,799
Carrots ..... bushels	3,119	4,084	4,800	5,523	7,760	7,524	10,161
Cauliflower ..... crates	3,367	2,763	3,493	5,581	4,173	5,031	6,450
Celery ..... do	5,684	6,509	6,702	5,767	7,585	7,624	8,686
Corn, sweet ..... tons	603	528	1,014	816	414	593	639
Cucumbers ..... bushels	7,671	7,677	12,439	9,028	8,294	8,656	8,644
Eggplant ..... do	850	794	904	791	814	896	713
Lettuce ..... crates	11,006	13,219	16,061	17,144	19,369	18,382	20,325
Onions ..... bushels	17,306	19,242	19,756	21,574	23,797	20,454	25,867
Peas, green ..... tons	188	274	242	261	240	278	288
Peppers ..... bushels	3,010	3,681	3,459	3,912	3,536	4,466	4,103
Pimientos ..... tons	----------	----------	----------	13	16	16	20
Potatoes, early . bushels	26,244	44,100	30,889	36,625	44,827	55,475	35,613
Spinach ..... tons	94	107	105	128	141	141	189
Strawberries ..... quarts	256,409	318,121	228,675	276,385	320,991	334,331	331,441
Tomatoes ..... tons	1,608	1,686	2,322	1,375	1,628	1,394	1,846
Watermelons . . number	42,734	57,086	56,498	69,698	57,682	63,295	67,616

FARM VALUE [1]

Crop	1923	1924	1925	1926	1927	1928	1929
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Asparagus	15,081	9,589	10,137	14,188	13,697	14,565	16,808
Beans, snap	13,803	14,655	15,949	14,960	14,527	15,012	16,975
Cabbage	17,883	17,688	16,787	18,489	19,359	23,163	21,254
Cantaloupes	23,501	19,618	21,273	18,520	22,425	20,099	22,359
Carrots	2,624	3,430	2,902	3,533	4,366	5,122	5,917
Cauliflower	5,344	3,763	4,250	5,485	5,207	5,010	5,118
Celery	11,277	12,740	11,796	10,652	12,505	14,367	14,371
Corn, sweet	7,563	7,478	15,253	10,800	4,975	7,497	8,431
Cucumbers	13,446	10,874	14,225	10,585	9,495	9,356	12,054
Eggplant	1,803	982	937	931	754	777	887
Lettuce	17,561	19,405	23,708	28,233	22,118	31,064	37,034
Onions	23,342	16,472	21,488	16,272	18,775	24,099	19,039
Peas, green	13,061	18,220	16,689	18,609	18,808	19,879	21,338
Peppers	4,880	4,141	4,440	4,540	3,559	4,201	4,566
Pimientos	----------	----------	----------	518	636	627	742
Potatoes, early	41,690	40,165	42,895	56,002	61,358	31,076	46,662
Spinach	5,305	7,770	8,066	7,624	7,927	8,052	8,712
Strawberries	38,258	44,381	40,623	48,231	48,268	45,711	44,872
Tomatoes	56,228	57,700	63,405	42,829	43,629	41,261	50,777
Watermelons	10,645	9,147	13,360	10,156	10,741	11,025	11,820
Total	323,295	318,218	348,183	341,157	343,129	331,964	369,736

Bureau of Agricultural Economics. Estimates based upon returns from crop reporters.

[1] Based upon average seasonal farm price.

TABLE 286.—*Fruits and vegetables: Unloads of 13 commodities at 11 markets in car lots, 1927–1928*

Commodity and year	New York	Chicago	Philadelphia	Pittsburgh	St. Louis	Cincinnati	Minneapolis	Kansas City	Washington	Cleveland	Detroit	Total
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
Apples:												
1927	12, 827	6, 868	1, 586	2, 127	1, 248	1, 301	712	1, 050	316	1, 106	1, 824	30, 965
1928	12, 923	7, 428	2, 211	1, 932	1, 325	1, 153	748	1, 104	483	1, 640	2, 415	33, 362
Cabbage:												
1927	4, 240	1, 878	2, 039	1, 228	1, 237	675	147	448	431	728	670	13, 721
1928	4, 853	2, 228	2, 199	1, 158	1, 194	725	137	407	578	572	717	14, 768
Cantaloupes:												
1927	7, 401	3, 211	1, 932	1, 302	697	667	243	426	359	1, 039	1, 000	18, 277
1928	8, 930	3, 263	1, 937	1, 403	710	650	225	430	429	991	988	19, 956
Celery:												
1927	4, 463	2, 378	1, 512	817	566	412	321	368	346	423	712	12, 318
1928	4, 926	2, 302	1, 698	791	617	374	340	405	353	411	708	12, 925
Grapes:												
1927	18, 587	7, 029	4, 369	2, 498	921	595	370	385	291	1, 743	1, 746	38, 534
1928	14, 455	5, 751	4, 061	3, 016	931	637	405	492	295	1, 468	2, 036	33, 547
Lettuce:												
1927	9, 054	4, 548	2, 911	1, 087	1, 271	561	463	636	530	1, 017	1, 388	23, 466
1928	9, 098	4, 491	2, 762	1, 198	1, 238	548	532	698	559	916	1, 406	23, 446
Onions:												
1927	9, 421	2, 327	2, 018	858	964	423	156	455	276	748	1, 130	18, 776
1928	11, 863	2, 347	1, 962	851	796	465	197	432	318	785	1, 079	21, 095
Peaches:												
1927	4, 773	2, 158	959	769	608	641	266	305	293	863	1, 243	12, 878
1928	5, 859	2, 374	1, 467	1, 037	816	909	321	558	329	933	1, 452	16, 055
Potatoes:												
1927	22, 308	15, 685	7, 818	3, 775	4, 410	3, 001	798	2, 907	1, 691	3, 703	5, 500	71, 596
1928	22, 029	16, 311	6, 653	3, 565	3, 647	2, 970	524	2, 603	1, 753	3, 699	5, 508	69, 262
Strawberries:												
1927	2, 181	1, 701	447	484	296	364	235	225	85	426	718	7, 162
1928	2, 097	1, 590	378	520	330	559	249	267	53	428	877	7, 348
Sweet potatoes:												
1927	2, 707	1, 859	422	1, 014	318	603	184	180	251	655	781	8, 974
1928	2, 235	1, 711	281	973	215	496	185	101	272	564	631	7, 664
Tomatoes:												
1927	7, 158	3, 314	1, 726	1, 488	655	505	256	314	387	377	1, 186	17, 366
1928	7, 456	3, 132	1, 355	1, 347	527	478	227	282	341	340	1, 129	16, 614
Watermelons:												
1927	3, 328	2, 397	1, 340	795	930	794	298	513	494	811	1, 167	12, 867
1928	3, 663	2, 371	1, 351	895	1, 001	942	268	558	502	956	1, 418	13, 925
Total: [1] [2]												
1920	48, 295	27, 225	17, 521	14, 421	7, 359	6, 225	1, 828	5, 032	2, 847	7, 585	6, 272	144, 610
1921	59, 107	32, 467	19, 430	15, 130	9, 083	8, 217	2, 122	5, 650	3, 131	7, 818	6, 193	168, 348
1922	67, 448	35, 405	20, 126	15, 869	10, 436	8, 874	2, 819	5, 989	4, 079	9, 666	8, 633	189, 344
1923	89, 906	45, 025	25, 734	18, 827	11, 057	9, 604	3, 049	7, 173	4, 607	11, 110	10, 744	236, 836
1924	102, 035	49, 484	29, 661	18, 443	12, 244	10, 465	3, 844	7, 220	5, 365	13, 509	11, 517	263, 787
1925	105, 285	51, 015	30, 437	18, 480	13, 300	10, 197	4, 402	8, 587	5, 909	13, 248	15, 539	276, 399
1926	107, 870	53, 060	30, 121	18, 666	14, 214	10, 509	5, 316	7, 870	6, 155	13, 913	17, 509	285, 203
1927	110, 906	55, 353	29, 079	18, 242	14, 121	10, 542	4, 449	8, 212	5, 750	13, 639	19, 065	289, 438
1928	111, 913	58, 331	28, 315	18, 686	13, 347	10, 906	4, 358	8, 337	6, 547	13, 703	20, 364	294, 807

Bureau of Agricultural Economics. Compiled from daily reports made by common carriers to bureau representatives in the various markets. Unloads as shown in car lots include those by boat reduced to car-lot basis. See 1927 yearbook, p. 904, for data for earlier years.

[1] Total includes: 1920, 9 commodities; 1921 and 1922, 10 commodities; 1923, 12 commodities; beginning 1924, 13 commodities.

[2] The totals include l. c. l. unloads converted to car-lot equivalents as follows: New York, 6,756 cars in 1920; 5,498 in 1921; 6,393 in 1922; 5,856 in 1923; 5,805 in 1924; 4,765 in 1925; 3,414 in 1926; 2,463 in 1927; 1,526 in 1928; Chicago, 3,032 in 1928; Washington, 282 in 1928.

TABLE 287.—*Vegetables, canned: Production and value for census years, 1899–1927*

QUANTITY

Commodity	Standard cases [1]							Actual cases	
	1899	1904	1909	1914	1919	1921	1923	1925	1927
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Asparagus	(2)	(2)	229	638	1,007	740	1,462	1,896	2,177
Beans with pork, with sauce and baked [3]			1,752	5,977	11,142	(4)	14,424	17,009	17,887
Beans other than baked	1,494	2,588	1,641	3,017	3,682	11,316	6,044	7,671	7,473
Beets			126	252	584	391	545	1,557	815
Corn	6,337	11,210	7,451	9,920	14,403	9,011	14,704	22,597	10,255
Hominy				686	587			1,133	1,695
Kraut				1,184	1,042	(2)	2,072	2,395	3,101
Peas	2,544	4,691	5,902	8,826	9,326	8,222	14,434	16,544	13,085
Pimentos								253	487
Pumpkin	138	247	440	789	383			1,183	1,094
Squash			114	166	55				
Spaghetti								1,841	2,751
Spinach			149	392	676	581	1,875	2,045	2,462
Sweet potatoes	84	193	347	454	746	623		769	
Tomatoes	8,701	9,411	12,910	16,200	11,836	4,134	14,781	21,807	18,229
Tomato paste					113	(2)	219	623	438
Tomato pulp				752	1,518	(2)	2,005	3,630	2,459
Tomato sauce								580	410
Other vegetables	27	1,237	1,691	1,005	1,008	3,169	3,186	[5] 11,335	[5] 12,539
Canned soups			854	4,886	5,845	6,862	14,186		

VALUE

Commodity	1899	1904	1909	1914	1919	1921	1923	1925	1927
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Asparagus	(2)	(2)	1,976	2,791	6,572	5,137	10,955	10,487	12,202
Beans with pork, with sauce and baked			3,418	11,535	28,551	(4)	25,265	35,511	34,959
Beans other than baked	2,025	4,134	2,596	5,030	10,857	30,712	14,373	19,653	18,110
Beets			261	512	1,951	1,203	1,763	3,810	2,050
Corn	8,191	15,952	10,332	13,923	35,532	19,550	30,833	51,346	22,855
Hominy				713	1,346			1,517	2,180
Kraut				1,568	2,845	(2)	5,146	4,574	5,460
Peas	4,466	7,929	10,247	15,089	25,073	22,953	39,768	42,887	34,031
Pimentos								1,463	2,069
Pumpkin	202	346	576	1,023	861			2,593	1,984
Squash			195	294	165				
Spaghetti								5,551	6,061
Spinach			294	737	2,338	2,087	4,978	5,456	6,225
Sweet potatoes	124	284	532	737	2,478	1,808		2,122	
Tomatoes	13,667	14,021	18,748	25,532	38,068	12,509	39,677	42,680	33,814
Tomato paste					1,301	(2)	1,988	2,809	2,298
Tomato pulp				1,454	3,819	(2)	3,870	6,639	3,861
Tomato sauce								1,947	1,084
Other vegetables	60	2,945	2,394	3,476	2,817	8,645	8,964	[5] 41,842	[5] 45,017
Canned soups			2,589	7,877	11,858	13,584	27,135		
Total vegetables and soups	28,735	45,611	54,158	92,291	176,432	118,188	214,715	282,891	234,260

Bureau of Agricultural Economics. Data for 1899, 1904, and 1909, Thirteenth Census of United States, 1910, Vol. X, Manufactures, pp. 391 396. Data for 1914, Census of Manufactures, 1914, Vol. II, pp. 382-383. Data for 1919, 1921, 1923, 1925, 1927, Census of Manufactures bulletins on canning and preserving.

[1] Standard cases expressed as follows: Asparagus, 1909, 24 No. 3 cans, 1914, 24 No. 2 cans, 1919, 1921, 1923, No. 2½ cans; beans, 24 No. 2 cans; beets, 24 No. 3 cans; corn, 24 No. 2 cans; hominy, 24 No. 3 cans; kraut, 24 No. 3 cans; peas, 24 No. 2 cans; pumpkin, 24 No. 3 cans; squash, 24 No 3 cans; spinach, 24 No. 3 cans, sweet potatoes, 24 No. 3 cans; tomatoes, 24 No. 3 cans; tomato paste, 100 six-ounce cans; tomato pulp, 1914, standard cases of 12 No. 10 cans, 1919 and 1923, 6 No. 10 cans; other vegetables, 24 No. 3 cans except succotash in 1909, 1914, and 1919, which are No. 2 cans; canned soup, 48 No. 1 cans.
[2] Not reported separately.
[3] 1909–1923 reported as baked beans.
[4] Included in beans other than baked.
[5] Reported as other canned vegetables and canned soups.

TABLE 288.—*Vegetables, canned: Quantity, by States and total value, 1927* [1]

State	Asparagus	Beans with pork, with sauce and baked	Beans other than baked	Beets	Corn	Kraut	Peas	Pumpkin and squash	Spinach	Tomatoes	Tomato paste, pulp and sauce	Other canned vegetables and soups	Total
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Maine	------	------	91	------	741	------	86	------	------	------	------	49	967
Vermont	------	------	------	------	112	------	------	------	------	------	------	------	112
New York	4	[2] 1, 323	1, 114	231	640	1, 333	1, 610	25	88	423	------	148	6, 939
New Jersey	------	[3] 14, 253	105	64	------	------	------	53	------	311	207	([4])	14, 993
Pennsylvania	------	------	243	3	194	------	178	------	------	274	------	390	1, 282
Ohio	------	139	126	7	902	------	202	54	5	216	54	25	1, 730
Indiana	------	------	540	------	733	294	109	362	------	1, 280	1, 212	1, 778	6, 308
Illinois	------	[5] 860	612	------	1, 964	29	591	76	------	218	28	217	4, 595
Michigan	4	[6] 610	510	56	80	57	404	56	------	103	------	33	1, 913
Wisconsin	------	------	582	232	309	770	6, 608	------	------	------	------	------	8, 501
Minnesota	------	------	------	------	964	------	520	3	------	------	------	------	1, 487
Iowa	------	------	------	------	1, 429	------	------	90	------	136	------	------	1, 655
Missouri	------	------	65	------	------	------	------	------	------	697	------	------	762
Nebraska	------	------	------	------	228	------	------	------	------	------	------	------	228
Delaware	------	------	416	------	201	------	220	------	------	1, 201	96	------	2, 134
Maryland	------	525	1, 275	39	1, 523	5	1, 101	------	305	6, 005	208	277	11, 263
Virginia	------	------	------	------	------	------	------	------	------	1, 196	------	29	1, 225
Georgia	------	------	------	------	------	------	------	------	------	------	------	229	229
Kentucky	------	------	14	------	------	------	------	------	------	373	------	------	387
Tennessee	------	------	130	------	------	104	------	------	------	592	6	------	832
Mississippi	------	------	78	------	------	------	------	------	------	------	------	130	208
Arkansas	------	------	41	------	------	------	------	------	------	1, 169	------	11	1, 221
Louisiana	------	------	26	------	------	------	------	------	------	------	------	------	26
Oklahoma	------	------	------	------	------	------	------	------	------	57	------	------	57
Texas	------	------	18	------	------	------	------	------	------	22	------	------	40
Montana	------	------	------	------	------	------	261	------	------	------	------	------	261
Colorado	------	------	299	------	------	------	------	------	------	178	37	------	514
Utah	------	------	145	9	------	------	758	9	------	978	168	24	2, 091
Washington	------	13	41	------	------	3	126	18	------	------	------	45	246
Oregon	------	------	48	------	------	------	------	133	------	15	------	150	346
California	2, 151	------	98	------	------	------	------	------	1, 989	2, 588	955	458	8, 239
Other States	18	164	856	174	235	506	311	215	75	197	336	10, 728	13, 815
Total	2, 177	17, 887	7, 473	815	10, 255	3, 101	13, 085	1, 094	2, 462	18, 229	3, 307	[7] 17,472	[8] 97,357
Total value, (1,000 dollars)	12, 202	34, 959	18, 110	2, 050	22, 855	5, 460	34, 031	1, 984	6, 225	33, 814	7, 243	55, 327	234, 260

Bureau of Agricultural Economics. Compiled from Census of Manufactures, 1927.

[1] Quantity stated in actual cases.
[2] Includes Massachusetts and Maine.
[3] Includes Indiana and Pennsylvania.
[4] Figures can not be given without disclosing the production of individual establishments.
[5] Includes Iowa.
[6] Includes Nebraska and Utah.
[7] Includes 2,751,000 cases of spaghetti not reported by States.
[8] Includes 1,695,000 cases of hominy of which 1,172,000 cases were for Indiana; and 2,751,000 cases of spaghetti not reported by States.

TABLE 289.—*Vegetables: Imports into the United States, exclusive of imports from Canada, 1925–1929*

Commodity and country from which imported	Year ended June 30				
	1925	1926	1927	1928	1929
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Beans, Lima: Total	1,332	1,232	1,044	2,778	3,357
Cuba	1,329	1,229	1,033	2,729	3,273
Mexico	......	3	11	49	84
Other countries	3	......	......	......	......
Beans, string: Total	64	503	469	914	2,584
Mexico	62	413	428	888	2,549
Cuba	2	90	41	26	35
Beets: Total	828	997	644	864	403
Bermuda	674	739	414	552	16
Mexico	154	258	220	312	354
Other countries	......	......	10	......	33
Cabbage: Total	842	14,698	3,050	95	6,241
Netherlands	794	11,566	3,009	40	5,822
Denmark	......	2,573	......	......	384
Cuba	......	524	......	20	1
Mexico	28	34	41	34	34
Other countries	20	1	......	1	......
Carrots: Total	2,462	2,668	2,408	2,026	5,577
Mexico	271	383	471	652	569
Bermuda	2,191	2,285	1,887	1,374	255
Netherlands	......	......	50	......	4,686
Other countries	......	......	......	......	67
Celery: Total	1,313	2,271	3,706	2,667	3,522
Bermuda	1,312	2,270	3,705	2,665	3,519
Other countries	1	1	1	2	3
Cucumbers: Total	331	670	1,325	1,247	966
Cuba	170	460	1,015	1,030	952
Mexico	161	200	310	216	13
Other countries	......	10	......	1	1

Commodity and country from which imported	Year ended June 30				
	1925	1926	1927	1928	1929
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Eggplant: Total	2,925	5,178	6,587	7,061	6,562
Cuba	2,767	4,708	6,085	6,216	6,265
Mexico	149	469	495	796	292
Other countries	9	1	7	49	5
Endive: Total	1,075	1,552	1,680	2,391	2,588
Belgium	1,063	1,536	1,651	2,391	2,588
France	12	6	......	......	......
England	......	10	28	......	......
Netherlands	......	......	1	......	......
Horse-radish: Total	2,252	2,057	767	690	1,389
Germany	2,252	2,029	767	690	1,387
Other countries	......	28	......	......	2
Kale: Bermuda	643	678	908	676	1,150
Okra: Total	293	929	640	1,349	1,557
Cuba	293	893	640	1,345	1,557
Mexico	......	36	......	4	......
Parsley: Total	1,110	1,515	1,045	1,621	660
Bermuda	1,095	1,493	1,020	1,593	635
Mexico	15	22	25	28	25
Peas: Total	3,331	9,095	14,278	14,443	20,551
Mexico	3,328	9,090	14,277	14,441	20,551
Other countries	3	5	1	2	......
Peppers: Total	10,441	17,391	17,608	16,631	12,222
Cuba	6,338	12,032	8,620	6,008	4,479
Mexico	4,102	5,350	8,968	10,602	7,738
Virgin Islands	......	1	15	15	1
Other countries	1	8	5	6	4

Bureau of Agricultural Economics. Compiled from the annual reports of the Federal Horticultural Board, 1925–1929, as provided by quarantine 56, which became effective Nov. 1, 1923.

TABLE 290.—*Beans, dry edible:*[1] *Acreage, production, value, exports, etc., United States, 1899, 1909, 1914–1929*

Year	Acreage	Average yield per acre	Production	Price per bushel received by producers Dec. 1[2]	Farm value	Wholesale price at Chicago[3]	Imports year beginning July 1[4]	Domestic exports, year beginning July 1[4][5]
	1,000 acres	*Bushels*	*1,000 bushels*	*Dollars*	*1,000 dollars*	*Dollars*	*1,000 bushels*	*1,000 bushels*
1899	*454*	*11.2*	*5,064*			1.23	([6])	
1909	*803*	*14.0*	*11,251*			2.27	1,015	
1914	875	13.2	11,585	2.26	26,213	1.33	906	
1915	928	11.1	10,321	2.59	26,771	1.91	663	
1916	1,107	9.7	10,715	5.10	54,686	2.54	3,748	
1917	1,821	8.8	16,045	6.50	104,350	5.45	4,146	1,517
1918	1,744	10.0	17,397	5.28	91,863	6.89	4,016	4,489
1919	*1,162*	*12.1*	*14,079*					
1919	1,065	12.6	13,399	4.26	57,046	4.75	3,806	1,993
1920	852	10.8	9,225	2.96	27,282	4.06	824	1,216
1921	782	11.7	9,185	2.67	24,515	2.77	520	1,100
1922	1,086	11.9	12,877	3.74	48,133	4.48	2,623	672
1923	1,344	12.1	16,308	3.67	59,782	4.22	886	695
1924	*1,637*							
1924	1,576	9.6	15,164	3.74	56,744	3.28	1,421	549
1925	1,606	12.4	19,928	3.28	65,376	3.70	1,271	576
1926	1,677	10.6	17,707	2.93	51,876	2.97	1,051	529
1927	1,571	10.3	16,181	2.88	46,612	[7] 3.31	2,465	427
1928	1,643	10.7	17,656	4.18	73,815	5.40	1,505	316
1929[8]	1,879	10.3	19,337	3.77	72,905	5.86		

Bureau of Agricultural Economics. Italic figures are census returns; census figures include all States; other figures, estimates of crop-reporting board, principal producing States only.

[1] Table includes, besides the ordinary edible beans and Limas, the blackeye of California which is identical with the blackeyed pea of the South. Soybeans not included.
[2] Farm prices are as of Nov. 15, 1914–1924.
[3] Prices 1899 and 1909 from Chicago Board of Trade annual reports, quotations for navy, good to choice; 1914–1928 from Daily Trade Bulletin, pea beans (quoted per 100 pounds; converted to bushels of 60 pounds.)
[4] Imports and exports compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929; and official records of the Bureau of Foreign and Domestic Commerce.
[5] Not separately reported prior to 1918.
[6] Not separately reported.
[7] 11 months.
[8] Preliminary.

TABLE 291.—*Beans, dry edible:*[1] *Acreage, production, and December 1 price, by States, 1926–1929*

State	Acreage				Average yield per acre				Production				Price per bushel received by producers Dec. 1—			
	1926	1927	1928	1929[2]	1926	1927	1928	1929	1926	1927	1928	1929[2]	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bus.*	*Bus.*	*Bus.*	*Bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Me	5	6	6	6	17.0	16.0	15.0	16.5	85	96	90	99	5.50	4.00	5.10	5.10
Vt	5	5	5	6	10.0	14.0	14.0	15.0	50	70	70	90	5.00	4.10	5.15	4.20
N. Y	97	75	80	100	11.8	13.0	14.5	12.5	1,145	975	1,160	1,250	3.70	3.70	4.70	4.45
Mich	552	566	538	694	12.0	8.5	11.0	8.2	6,624	4,811	5,918	5,691	2.80	3.00	4.45	3.70
Wis	9	6	6	9	7.5	6.7	9.0	8.5	68	40	54	76	3.00	3.30	3.90	3.60
Minn	7	5	5	6	12.0	11.0	9.0	9.0	84	55	45	54	3.10	3.30	4.00	4.35
Nebr	4	5	9	9	8.3	12.3	9.7	9.4	33	62	87	85	3.70	3.50	3.50	3.75
Kans			6	20			6.0	7.0			36	140			3.75	3.70
N. C		2	2	2		5.0	4.5	4.0		10	9	8		3.70	3.70	4.50
Mont	43	32	40	50	10.0	20.0	14.5	10.5	430	640	580	525	2.80	3.00	3.85	3.60
Idaho	54	72	86	92	18.5	23.7	19.0	23.0	999	1,706	1,634	2,116	2.60	2.50	3.60	2.75
Wyo	16	17	24	26	12.5	18.0	15.0	18.5	200	306	360	481	3.00	2.90	3.40	3.10
Colo	378	281	309	294	3.6	5.5	4.5	6.5	1,361	1,546	1,390	1,911	2.80	2.70	3.40	2.70
N. Mex	195	195	214	225	4.3	5.0	4.0	7.5	838	975	856	1,688	2.60	2.90	3.15	2.60
Ariz	7	8	6	6	8.0	8.0	7.0	8.0	56	64	42	48	3.50	3.60	3.70	3.15
Calif	305	296	307	334	18.8	16.3	17.3	15.2	5,734	4,825	5,325	5,075	3.00	2.70	4.40	4.95
U. S	1,677	1,571	1,643	1,879	10.6	10.3	10.7	10.3	17,707	16,181	17,656	19,337	2.93	2.88	4.18	3.77

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Table includes, besides the ordinary edible beans and Limas, the blackeye of California which is identical with the blackeyed pea of the South. Soybeans not included.
[2] Preliminary.

TABLE 292.—*Beans, dry edible:* [1] *Production by varieties, leading States, 1928 and 1929*

State and year	White pea beans	Small white	Large white	Great Northern	Yellow eye	White kidney	Red kidney	Cranberry	Red Mexican	Pinto	Pinks	Limas [2]	Black eye	Other varieties [3]	Total
	1,000 bus.	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*	*1,000 bus.*
Maine:															
1928	18	-----	5	-----	38	6	16	-----	-----	-----	-----	-----	-----	7	90
1929	7	-----	5	-----	54	7	14	-----	-----	-----	-----	-----	-----	12	99
Vermont:															
1928	10	-----	7	-----	31	4	3	-----	-----	-----	-----	-----	-----	15	70
1929	14	-----	5	-----	45	5	4	-----	-----	-----	-----	-----	-----	17	90
New York: [4]															
1928	438	-----	184	-----	121	45	340	-----	-----	-----	-----	-----	-----	32	1,160
1929	516	-----	220	-----	105	62	335	-----	-----	-----	-----	-----	-----	12	1,250
Michigan:															
1928	4,900	-----	150	-----	-----	-----	660	-----	-----	-----	-----	-----	-----	208	5,918
1929	4,860	-----	180	-----	-----	-----	445	-----	-----	-----	-----	-----	-----	206	5,691
Wisconsin:															
1928	36	-----	10	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	8	54
1929	62	-----	8	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	6	76
Minnesota:															
1928	45	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	45
1929	54	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	54
Nebraska:															
1928	-----	18	-----	27	-----	-----	-----	-----	-----	42	-----	-----	-----	-----	87
1929	-----	42	-----	12	-----	-----	-----	-----	-----	31	-----	-----	-----	-----	85
Montana:															
1928	-----	19	-----	524	-----	-----	-----	-----	25	-----	-----	-----	-----	12	580
1929	-----	16	-----	475	-----	-----	-----	-----	25	-----	-----	-----	-----	9	525
Idaho:															
1928	-----	25	-----	1,134	-----	-----	-----	-----	245	10	-----	-----	-----	[5] 220	1,634
1929	-----	35	-----	1,475	-----	-----	-----	-----	280	10	-----	-----	-----	[5] 316	2,116
Wyoming:															
1928	-----	-----	-----	308	-----	-----	-----	-----	-----	11	-----	-----	-----	41	360
1929	-----	-----	-----	395	-----	-----	-----	-----	-----	12	-----	-----	-----	[5] 74	481
Colorado:															
1928	-----	-----	-----	56	-----	-----	-----	-----	-----	1,302	-----	-----	-----	32	1,390
1929	-----	19	-----	19	-----	-----	-----	-----	-----	1,816	-----	-----	-----	57	1,911
New Mexico:															
1928	-----	-----	-----	-----	-----	-----	-----	-----	-----	800	34	-----	-----	22	856
1929	-----	-----	-----	-----	-----	-----	-----	-----	-----	1,600	44	-----	-----	44	1,688
Arizona:															
1928	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	35	-----	-----	7	42
1929	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	40	-----	-----	8	48
California:															
1928	-----	707	38	-----	-----	-----	115	177	225	85	912	2,258	713	[3] 95	5,325
1929	-----	650	30	-----	-----	-----	50	183	100	58	800	2,300	817	[3] 87	5,075
Total 14 States:															
1928	5,447	769	394	2,049	190	55	1,134	177	495	2,250	981	2,258	713	699	[6] 17,656
1929	5,513	762	448	2,376	204	74	848	183	405	3,527	884	2,300	817	848	[6] 19,337

Bureau of Agricultural Economics. Based upon reports by growers on proportion of total production made up of each variety, supplemented by investigations of field statisticians.

[1] Table includes, besides the ordinary edible beans and Limas, the blackeye of California, which is identical with the blackeyed pea of the South. Soybeans not included.
[2] Limas include Baby Limas, 1928, 668; 1929, 700.
[3] "Other" include Bayo; 1928, 20; 1929, 20.
[4] Large white in New York is the marrow.
[5] Including garden or seed beans: Idaho, 1928, 195; 1929, 291; and Wyoming, 1929, 72.
[6] Including the production in North Carolina of "Other varieties": 1928, 9; 1929, 8; and in Kansas, 1928, 36; 1929, 140.

TABLE 293.—*Beans, dry: Car-lot shipments, by State of origin, 1920–1928*

State	Crop movement season [1]								
	1920	1921	1922	1923	1924	1925	1926	1927	1928 [2]
	Cars	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*	*Cars*
New York	935	1,555	1,650	1,969	1,900	1,158	916	614	820
Michigan	5,095	4,784	5,477	8,333	7,848	10,506	8,699	4,989	6,444
Montana	29	12	44	104	124	288	280	386	536
Idaho	139	141	351	749	1,336	1,898	1,437	2,074	1,983
Wyoming	-------	1	-------	9	31	82	130	252	347
Colorado	333	486	427	1,732	1,316	2,927	1,866	1,711	1,563
New Mexico	740	839	75	146	388	170	412	608	677
California	3,148	3,403	3,774	2,951	1,847	2,558	3,433	3,230	2,598
Other States	80	83	46	100	134	138	114	55	71
Total	10,499	11,304	11,844	16,093	14,924	19,725	17,287	13,919	15,039

Bureau of Agricultural Economics. Compiled from monthly reports received by the bureau from local agents of common carriers throughout the country. Shipments as shown in car lots include those by boat reduced to car-lot basis.

[1] Crop movement season extends from September of year shown through August of the following year.
[2] Preliminary.

TABLE 294.—*Beans, dry: Wholesale price per 100 pounds, 1900–1929*

PEA, BOSTON [1]

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1900	------	------	------	------	3.77	3.70	3.55	3.48	3.38	3.45	3.63	4.43	------
1901	4.10	3.57	3.38	3.37	3.23	3.02	2.87	2.85	3.03	2.87	3.40	3.37	3.26
1902	3.25	4.13	4.02	3.93	4.02	3.93	3.80	3.75	3.82	3.90	3.85	3.77	3.85
1903	3.93	3.82	3.63	3.52	3.42	3.50	3.40	3.27	3.28	3.10	3.02	3.07	3.41
1904	2.98	3.13	3.00	2.90	2.92	3.22	3.12	2.97	3.00	3.03	3.13	2.98	3.03
1905	2.92	2.92	2.98	2.98	2.93	2.75	2.65	2.73	2.73	2.73	2.75	2.60	2.81
1906	2.57	2.70	2.68	2.53	2.50	2.52	2.50	2.42	2.85	3.08	2.87	2.98	2.68
1907	3.53	4.05	4.08	3.90	3.85	3.98	3.93	4.00	4.47	4.50	4.43	4.40	4.09
1908	4.00	3.93	4.00	3.93	4.03	4.17	4.25	4.23	4.50	4.58	4.53	4.33	4.21
1909	4.05	3.92	3.87	3.77	3.87	3.93	3.88	3.77	3.92	4.05	4.08	4.17	3.94
1910	4.47	4.20	3.98	3.87	3.85	3.72	3.52	3.55	3.63	3.70	3.95	4.15	3.88
1911	4.07	4.30	4.37	4.28	4.47	4.47	4.40	4.48	4.97	5.02	5.00	5.05	4.57
1912	5.17	5.17	4.82	4.40	4.25	4.17	4.03	3.98	4.13	4.07	3.97	3.70	4.32
1913	3.90	3.92	3.73	3.65	3.63	3.58	3.57	3.73	3.85	3.68	3.68	4.87	3.82
1914	4.75	4.18	4.53	4.65	5.30	5.70	5.40	5.30	5.40	5.40	5.13	5.12	5.07
1915	5.43	6.13	6.60	6.65	6.78	6.63	6.52	6.70	7.05	8.05	10.23	9.37	7.18
1916	9.22	9.87	11.67	11.23	11.43	12.08	13.03	14.70	16.40	15.47	14.58	13.75	11.79
1917	13.80	15.15	------	------	------	------	14.19	13.56	12.88	12.35	12.00	11.75	------
1918	11.05	10.75	10.75	10.05	9.47	8.00	7.40	7.84	7.97	7.80	7.72	8.68	8.96
1919	8.28	7.81	7.58	7.75	7.51	7.62	7.46	7.29	7.62	7.62	7.59	6.99	7.59
1920	6.88	6.36	5.67	5.14	4.98	4.68	4.64	4.52	4.44	4.64	4.58	4.96	5.12
1921	5.41	5.24	5.34	5.08	5.14	5.76	6.88	7.34	8.14	9.69	9.75	9.03	6.90
1922	7.06	6.97	7.68	7.81	7.62	7.71	7.66	7.60	7.27	7.35	7.18	6.89	7.40
1923	7.40	7.75	7.79	7.12	7.06	7.40	7.30	7.28	7.12	7.12	7.16	7.68	7.35
1924	8.04	8.18	8.10	8.00	6.94	7.20	6.91	6.60	6.31	6.34	6.17	5.89	7.06
1925	5.50	5.49	5.86	5.90	5.67	5.49	5.32	5.06	5.01	5.48	5.65	5.48	5.49
1926	5.28	5.98	6.32	6.11	5.86	5.66	5.38	5.28	5.46	6.29	6.48	6.62	5.89
1927	6.34	6.18	6.12	6.16	6.69	7.88	8.71	9.81	10.08	10.18	10.30	10.22	8.22
1928	9.94	9.75	9.55	9.50	9.95	10.97	11.13	10.41	10.45	10.38	9.97	10.32	10.19
1929	10.56	10.12	8.66	8.09	------	------	------	------	------	------	------	------	------

[1] Quoted as New York and Michigan, hand picked.

TABLE 294.—*Beans, dry: Wholesale price per 100 pounds, 1900–1929*—Contd.

SMALL WHITE, SAN FRANCISCO

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1900	3.88	3.68	3.95	4.25	4.15	4.32	4.25	4.35	4.32	4.25	4.20	3.12	4.06
1901	3.15	3.50	3.00	3.02									
1902					3.15	3.12	3.15	3.15	3.08	3.12	3.12	3.10	
1903	3.05	3.12	2.95	2.70	2.88	2.90	2.98	3.02	3.02	2.98	2.88	2.88	2.95
1904	2.92	3.04	3.02	3.02	3.02	3.02	3.10	3.10	3.08	3.12	3.18	3.18	3.07
1905	3.30	3.30	2.95	2.98									
1906					2.78	2.80	2.88	2.98	2.92	2.90	2.88	2.92	
1907	3.00	3.30	3.50	3.48	3.48	3.50	3.50	3.50	3.92	4.35	4.48	4.68	3.72
1908	4.50	4.25	4.48	4.52	4.70	5.20	5.30	5.50	5.75	6.50	6.62	7.12	5.37
1909	4.25	4.32	4.75	4.75	4.68	4.65	4.68	4.55	4.42	4.25	4.05	3.98	4.44
1910	3.98	3.75	3.52	3.38	3.30	3.38	3.38	3.45	3.38	3.40	3.45	3.60	3.50
1911	3.75	3.68	3.85	4.08	4.12	4.12	4.08	4.10	4.30	4.58	4.72	4.60	4.16
1912	4.45	4.55	4.60	4.58	4.60	4.62	4.60	5.00	5.22	5.68	5.72	5.55	4.93
1913	5.35	5.30	4.94	4.95	5.25	5.25	5.30	5.12	4.95	4.92	4.92	5.62	5.16
1914	5.00	4.25	4.50	4.55	5.00	5.60	5.60	5.60	5.60	5.28	4.85	4.68	50.4
1915	4.55	5.05	5.82	6.25	6.38	6.38	6.38	6.45	6.95	9.38	10.50	8.75	6.90
1916	8.25	8.50	10.00	10.50	10.75	11.25	12.00	14.12	15.50	15.50	14.88	13.88	12.09
1917	13.25	12.88	12.38	12.00	11.88	12.38		12.50	12.50	12.50	12.12	12.12	
1918	11.75	11.25	10.18	9.15	8.56	7.29	6.59	6.73	6.78	6.90	7.00	7.90	8.34
1919	7.50	6.73	6.32	6.30	6.64	6.53	6.40	5.94	6.20	6.40	6.29	5.72	6.41
1920	5.58	4.56	4.38	4.19	3.82	3.86	3.63	3.49	3.39	3.42	3.68	4.22	4.02
1921	4.55	4.68	4.79	4.79	4.89	5.25	6.08	6.50	6.58	6.59	7.39	6.33	5.70
1922	5.40	5.59	6.11	6.48	7.48	7.23	7.27	7.22	6.76	6.81	6.42	6.05	6.57
1923	6.75	6.05	6.09	5.92	5.92	6.18	6.03	6.02	6.04	6.29	7.04	7.29	6.33
1924	7.86	8.00	7.89	7.18	7.22	7.71	7.54	7.49	7.38	7.31	7.42	7.42	7.54
1925	7.32	6.20	5.71	5.98	6.26	6.25	5.97	5.87	5.62	5.57	5.83	5.95	6.04
1926	5.66	5.89	5.94	5.81	5.83	5.85	5.86	6.34	7.17	8.26	8.57	8.58	6.65
1927	7.75	5.60	5.88	5.80	6.21	6.66	8.42	9.20	9.28	9.03	8.75	8.36	7.58
1928	7.15	8.11	8.40	8.52	9.23	9.99	9.90	9.59	9.45	9.45	10.59		
1929		8.67	8.55	8.06									

LIMA, CALIFORNIA, NEW YORK

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
1900					6.37	6.33	6.53	6.83	7.05	7.18	7.33	7.67	
1901			5.50	5.47	5.43	5.35	5.25	4.78	4.52	4.63	4.63	4.62	
1902	4.57	4.83	5.13	5.03	5.03	5.03	4.93	4.67	4.52	4.42	4.27	4.13	4.71
1903	4.18	4.07	3.75	3.75	3.85	4.10	4.13	4.00	3.98	3.97	4.08	4.25	4.01
1904	4.47	4.88	5.18	5.00	4.98	5.15	5.90	5.65	5.92	6.32	6.40	6.42	5.52
1905	6.27	4.78	4.57	5.03	5.62	5.63	5.43	5.23	5.27	5.10	5.03	4.77	5.23
1906	4.70	4.73	5.05	4.97	4.90	4.90	5.03	4.94	5.12	5.97	5.97	5.88	5.18
1907	6.60	6.45	5.95	6.10	5.92	5.58	5.47	5.47	5.53	5.72	5.63	5.63	5.84
1908	5.58	5.28	5.10	5.03	4.83	4.62	4.63	4.77	5.00	5.03	5.08	4.98	4.99
1909	5.02	5.02	5.05	4.88	4.87	4.97	4.95	5.02	5.00	5.08	5.17	5.23	5.02
1910	5.38	5.53	5.37	5.40	5.87	6.49	6.44	6.67	6.79	6.74	6.72	6.64	6.17
1911	6.58	5.96	6.11	6.55	6.51	6.52	6.74	6.71	6.49	6.24	6.15	6.18	6.40
1912	6.24	6.44	6.34	6.28	6.30	6.21	6.11	6.00	5.92	6.32	6.45	6.32	6.24
1913	6.18	6.11	6.03	5.97	5.91	5.98	6.43	7.26	7.28	7.33	7.48	8.10	6.67
1914	7.85	6.33	5.98	5.96	5.98	6.31	5.98	5.61	5.48	5.32	5.07	5.09	5.91
1915	5.26	5.40	5.60	5.47	5.28	5.18	5.22	5.40	5.48	5.86	7.36	6.71	5.68
1916	6.32	6.96	7.58	8.06	8.04	10.19	13.20	14.91	16.19	15.35	13.97	13.00	11.15
1917	13.35	14.97	14.62	13.52	13.12	13.86	14.36	14.03	13.38	12.70	12.94	13.60	13.70
1918	13.38	13.79	13.25	12.50	11.88	10.50	8.25	8.58	8.88	9.39	9.41	12.35	11.01
1919	12.44	14.16	13.98	14.41	14.45	14.31	12.13	11.84	11.95	12.57	12.84	12.46	13.13
1920	11.62	8.47	8.18	7.97	7.62	7.67	7.10	6.56	6.77	6.90	6.55	6.69	7.68
1921	6.79	6.65	7.05	7.32	7.40	8.88	9.66	9.68	10.00	10.18	10.82	9.84	8.64
1922	8.91	8.49	8.65	8.91	9.39	9.79	9.59	9.41	8.59	8.80	8.25	8.55	8.94
1923	9.40	9.84	10.41	10.09	10.81	11.30	12.40	12.68	12.48	12.59	12.62	13.04	11.47
1924	13.62	14.42	14.12	13.89	14.41	15.00	14.79	14.85	14.94	15.27	15.79	16.27	14.78
1925	15.92	14.11	13.24	11.88	11.83	12.06	11.20	10.13	9.15	8.88	8.76	8.55	11.31
1926	8.94	8.44	7.68	7.01	7.14	6.94	6.97	6.97	6.86	6.74	6.68	6.67	7.25
1927	6.96	6.97	6.85	6.83	7.00	7.87	8.33	9.06	9.69	9.75	9.90	10.17	8.28
1928	9.90	9.76	10.56	12.01	12.61	13.42	13.50	13.50	14.40	15.25	15.90	16.17	13.08
1929	16.76	14.39	13.27	12.95									

Bureau of Agricultural Economics. Compiled from the Boston Produce Market Report, weekly; San Francisco Commercial News, daily; and New York Producers Price Current, daily.

TABLE 295.—*Soybeans: Acreage, production, and value, by States, 1928 and 1929*

State	Total equivalent solid acres for all purposes		Total production: Total acres, except hay [1]		Total production: Yield per acre [2]		Total production: Total production, except hay [2]		Beans gathered: Acres from which gathered [3]		Beans gathered: Beans gathered per acre		Beans gathered: Total quantity gathered		Beans gathered: Farm price Dec. 1 of beans gathered		Total value of total production, except hay [4]	
	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*Dolls. per bus.*	*Dolls. per bus.*	*1,000 dollars*	*1,000 dollars*
New York	3	3																
New Jersey	1	1																
Pennsylvania	9	8																
Ohio	166	180	58	70	15.0	14.5	870	1,015	37	49	15.0	14.5	555	710	1.95	1.75	1,696	1,776
Indiana	294	331	125	167	14.5	14.2	1,812	2,371	69	100	14.5	14.2	1,000	1,420	1.60	1.55	2,899	3,675
Illinois	497	544	220	270	16.5	16.5	3,630	4,455	186	240	16.5	16.5	3,069	3,960	1.40	1.50	5,082	6,682
Michigan	12	10	2	2	15.0	9.0	30	18	2	2	15.0	9.0	30	18	2.05	2.45	62	44
Wisconsin	18	11	3	2	12.5	11.0	38	22	2	1	12.5	11.0	25	11	2.55	2.55	97	56
Iowa	65	86	30	44	12.0	12.0	360	528	21	34	17.0	17.0	357	578	1.78	1.67	641	882
Missouri	407	436	115	174	12.5	10.0	1,438	1,740	103	161	12.5	10.0	1,288	1,610	1.90	1.95	2,732	3,393
Kansas	13	18	8	10	10.2	9.5	82	95	8	10	10.2	9.5	82	95	1.95	2.10	160	200
Delaware	25	27	15	16	18.0	10.5	270	168	15	16	18.0	10.5	270	168	1.50	2.15	405	361
Maryland	41	38	5	4	14.8	14.4	74	58	3	3	14.8	14.4	44	43	2.25	2.30	166	133
Virginia	121	115	21	20	13.0	9.0	273	180	14	13	13.0	9.0	182	117	2.00	2.45	546	441
West Virginia	32	31	3	3	14.5	15.2	44	46	2	2	14.5	15.2	29	30	2.65	2.70	117	124
North Carolina	326	370	218	250	15.0	14.0	3,270	3,500	120	162	11.5	12.0	1,380	1,944	1.65	1.70	5,396	5,950
South Carolina	44	45	29	27	14.0	15.0	406	405	9	8	5.5	8.0	50	64	2.05	2.40	832	972
Georgia	59	76	11	11	12.0	10.0	132	110	5	8	6.0	7.5	30	60	2.70	2.80	356	308
Kentucky	85	94	15	14	14.0	15.0	210	210	3	3	7.8	8.2	23	25	2.25	2.45	472	514
Tennessee	305	329	130	110	11.0	10.0	1,430	1,100	23	27	6.3	6.5	145	176	2.15	2.35	3,074	2,585
Alabama	58	69	8	9	14.0	14.0	112	126	3	2	6.0	5.5	18	11	2.15	2.60	241	328
Mississippi	123	140	44	56	15.5	13.5	682	756	12	14	10.0	10.0	120	140	2.30	2.85	1,569	2,155
Arkansas	64	90	34	46	15.0	14.0	510	644	2	8	8.4	6.8	17	54	2.40	2.65	1,224	1,707
Louisiana	62	77	36	42	12.0	9.3	432	391	10	12	5.3	8.7	53	104	2.45	3.00	1,058	1,173
Oklahoma	35	61	14	26	10.8	8.0	151	208	7	17	7.5	5.5	52	94	2.35	2.50	355	520
United States	2,865	3,190	1,144	1,373	14.2	13.2	16,256	18,146	656	892	13.4	12.8	8,819	11,432	1.80	1.87	29,180	33,979

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone.
[2] Including beans grazed or otherwise utilized as well as those gathered.
[3] Acres from which all or part of the beans grown were gathered.
[4] Total production (except hay) multiplied by price of gathered beans to give approximate total value.

TABLE 296.—*Soybean oil: Quantity of beans used in production and quantity of crude oil produced, 1922–1928*

Year beginning October	Soybeans crushed					Oil produced				
	Oct.–Dec.	Jan.–Mar.	Apr.–June	July–Sept.	Total	Oct.–Dec.	Jan.–Mar.	Apr.–June	July–Sept.	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1922	2,708	3,876	2,350	59[illegible]	9,528	364	768	272	78	1,482
1923	2,230	3,232	564	102	6,128	286	388	72	13	759
1924	3,550	7,478	3,038	4,336	18,402	477	870	360	562	2,269
1925	5,486	7,746	7,450	358	21,040	728	990	874	46	2,638
1926	5,132	6,804	6,032	2,104	20,072	735	862	776	286	2,659
1927	8,788	10,278	8,792	5,654	33,512	1,164	1,289	1,132	789	4,374
1928	11,480	21,190	9,666	10,560	52,896	1,506	3,083	1,277	1,456	7,322

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census, "Animal and vegetable fats and oils."

TABLE 297.—*Soybeans and soybean oil: International trade, years 1925–1928*

SOYBEANS

Country	Year ended Dec. 31							
	1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Principal exporting countries:								
China[1]	0	2,424,490	0	2,605,554	0	3,376,789		
Principal importing countries:								
Denmark	250,149	0	385,051	0	348,406	0	474,218	0
Germany	741,171		815,787		1,270,062		1,868,891	
Japan, including Chosen	956,461	4,942	936,136	4,955	884,710	6,524	1,031,713	5,669
Netherlands	80,463	1,861	41,694	2,610	21,907	539	40,180	463
Sweden	123,012	0	139,474	0	150,749	0	199,528	0
United Kingdom	360,600	0	101,082	0	182,831	0	430,866	0
United States[2]	3,812	0	3,728	0	4,189	0	4,256	0
Total 8 countries	2,515,668	2,431,293	2,422,952	2,613,119	2,862,854	3,383,852	4,049,652	6,132

SOYBEAN OIL

Country	1925 Imports	1925 Exports	1926 Imports	1926 Exports	1927 Imports	1927 Exports	1928, preliminary Imports	1928, preliminary Exports
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Principal exporting countries:								
China	0	265,240	0	355,631	0	329,298		
Denmark	9,703	28,327	2,288	31,391	4,394	33,837	1,267	46,466
Japan, including Chosen	33	15,955	128	19,236	115	11,167		
Principal importing countries:								
Algeria	5,271	11	5,165	3	17,860	15	3,542	
France	14,787	58	13,057	67	22,936	81	19,990	231
Germany	73,793	6,314	44,094	11,160	25,000	34,663	2,466	73,140
Netherlands	84,792	27,963	109,709	37,447	166,388	75,314	91,249	35,509
Sweden	9,871	7,545	12,714	9,763	7,874	14,572	10,019	16,796
United Kingdom	65,209	42,399	108,067	55,019	118,075	63,025	55,196	48,919
United States	19,493	520	30,712	1,567	14,915	5,444	13,116	7,142
Total 10 countries	282,952	394,332	325,934	521,284	377,847	567,416	196,845	228,203

Bureau of Agricultural Economics. Compiled from official sources.

[1] These figures are for yellow beans, including mostly soybeans, according to Agricultural Commissioner Paul O. Nyhus.
[2] Imports for consumption.

TABLE 298.—*Soybeans: Estimated average price per bushel, received by producers, United States, 1913–1929*

Year beginning October—	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Weighted average
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1913	1.96	1.57	1.72	1.96	1.80	1.76
1914	2.08	2.15	2.24	2.35	2.26	2.18
1915	1.88	2.08	2.23	2.31	2.39	2.11
1916	2.13	2.13	2.18	2.20	2.45	2.16
1917	2.73	2.86	3.33	3.47	3.82	3.05
1918	3.36	3.20	3.29	3.00	3.00	3.23
1919	3.34	3.35	3.44	3.76	4.05	3.45
1920	3.41	3.00	2.28	2.18	2.17	2.80
1921	2.20	2.22	2.08	2.11	2.16	2.17
1922	1.89	2.06	1.97	2.07	2.13	2.00
1923	2.09	2.11	2.11	2.23	2.26	2.12
1924	2.23	2.16	2.36	2.59	2.64	2.29
1925	2.27	2.18	2.17	2.38	2.33	2.23
1926	1.97	1.85	1.83	1.90	2.03	1.89
1927	1.86	1.70	1.61	1.70	1.69	1.72
1928	1.72	1.69	1.70	1.82	1.93	1.72
1929	1.79	1.70	1.73	1.85	----------	----------

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of soybeans for each State; yearly price obtained by weighting monthly prices by estimated monthly marketings.

TABLE 299.—*Soybeans for seed: Average wholesale selling price per 100 pounds at Baltimore and St. Louis, 1920–1929*

Year	Baltimore						St. Louis					
	Jan.	Feb.	Mar.	Apr.	May	Av.	Jan.	Feb.	Mar.	Apr.	May	Av.
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	6.80	8.00	8.00	8.00	8.60	7.88	8.10	10.00	9.90	9.65	10.00	9.53
1921	3.15	3.50	3.50	3.75	4.70	3.72	4.30	5.40	5.75	5.00	5.40	5.17
1922	3.20	3.50	3.50	3.50	3.30	3.40	4.00	4.00	4.20	3.85	4.55	4.12
1923	------	4.00	4.00	3.80	3.75	------	5.00	4.75	4.50	4.50	4.95	4.74
1924	3.50	4.00	4.00	4.50	5.00	4.20	4.70	4.70	4.70	4.70	4.60	4.68
1925	5.10	4.90	5.25	4.95	3.95	4.83	4.00	4.00	4.00	3.75	3.60	3.87
1926	3.35	3.42	3.50	3.56	4.62	3.69	3.55	3.61	3.88	4.25	4.85	4.03
1927	3.00	3.00	3.00	3.00	3.12	3.02	------	4.50	4.00	4.19	4.50	------
1928	3.25	3.22	3.25	3.32	3.55	3.32	3.00	3.00	3.12	3.31	3.75	3.24
1929	3.75	4.00	4.00	4.00	4.50	4.05	4.25	4.25	4.38	4.62	4.75	4.45

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high quality seed.

TABLE 300.—*Soybean oil, crude, in barrels: Wholesale price per pound, Saturday nearest the 15th of the month, New York, 1910–1929* [1]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	6.90	6.75	7.12	7.44	7.44	6.75	6.94	7.50	7.75	8.00	7.81	7.44
1911	7.38	7.88	7.56	7.00	7.00	6.25	6.38	6.44	6.69	7.62	7.00	6.88
1912	6.88	6.60	6.81	6.62	-------	6.40	6.62	6.56	6.56	6.62	6.50	6.00
1913	5.88	6.12	5.94	5.94	6.00	6.00	6.44	6.50	6.50	6.50	6.44	6.44
1914	6.44	6.62	6.38	6.38	6.38	6.25	-------	-------	-------	6.75	6.25	-------
1915	-------	-------	6.31	6.50	6.62	6.38	6.19	5.88	5.88	6.88	7.00	7.56
1916	8.19	8.56	9.38	9.38	9.12	8.12	7.88	7.88	8.50	10.00	11.31	11.87
1917	12.12	13.00	13.50	13.75	14.62	15.00	14.38	14.25	14.62	15.88	16.75	17.62
1918	18.25	18.88	19.25	19.62	19.12	18.38	18.25	18.25	18.38	18.38	17.25	17.00
1919	14.50	13.50	12.75	14.75	17.00	18.88	19.88	18.50	17.00	17.38	17.62	17.50
1920	19.50	18.25	18.62	18.00	17.75	17.00	15.50	14.00	13.50	12.62	11.75	9.00
1921	8.25	6.50	6.25	7.00	7.75	7.94	8.25	8.50	8.38	8.88	8.88	9.25
1922	8.88	9.12	10.88	11.38	-------	-------	-------	-------	-------	10.00	10.38	10.88
1923	11.19	11.69	12.62	13.12	13.12	12.62	11.88	11.62	11.62	10.88	11.00	11.38
1924	11.62	12.50	12.50	11.75	12.38	12.00	12.38	12.50	12.75	12.25	13.12	13.38
1925	13.25	13.25	13.25	13.38	13.38	13.38	13.38	13.38	13.38	13.38	13.38	13.38
1926	13.38	13.38	13.38	13.38	13.38	13.50	14.00	14.00	14.00	14.00	13.00	12.00
1927	12.00	12.12	12.12	12.12	12.38	12.12	12.12	12.12	12.12	13.25	12.12	12.12
1928	12.12	12.12	12.12	12.12	12.12	12.38	12.38	12.38	12.38	12.38	12.38	12.38
1929	12.38	12.38	12.38	12.00	11.75	11.75	11.75	11.12	11.12	12.62	12.62	12.25

Bureau of Agricultural Economics. Compiled from the Oil, Paint, and Drug Reporter.

[1] Prices through April, 1916, quoted as English; May, 1916–December, 1918, as Manchuria spot; beginning January, 1919, as crude.

TABLE 301.—*Cowpeas: Acreage, production, and value, by States, 1928 and 1929*

State	Total equivalent solid acres for all purposes		Total production						Peas gathered								Total value of total production except hay [4]	
			Total acres except hay [1]		Yield per acre [2]		Total production except hay [2]		Acres from which gathered [3]		Peas gathered per acre		Total quantity gathered		Farm price Dec. 1 of peas gathered			
	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*1,000 bushels*	*1,000 bushels*	*Dollars per bu.*	*Dollars per bu.*	*1,000 dollars*	*1,000 dollars*
New Jersey	1	1																
Ohio	25	21	2	2	15.0	15.0	30	30	2	2	15.0	15.0	30	30	2.40	2.65	72	80
Indiana	57	35	19	14	8.0	8.0	152	112	6	7	6.0	6.0	36	42	2.10	2.15	319	241
Illinois	188	104	48	48	8.0	8.0	384	384	47	47	6.0	5.5	282	258	1.85	1.85	710	710
Missouri	107	75	28	39	11.0	9.5	308	370	25	37	11.0	9.5	275	352	2.10	2.25	647	832
Kansas	5	7	3	3	9.0	8.5	27	26	3	3	9.0	8.5	27	26	2.30	2.40	62	62
Delaware	6	5	4	4	15.0	9.5	60	38	4	4	15.0	9.5	60	38	1.70	2.40	102	91
Maryland	16	14	2	2	9.0	10.0	18	20	2	2	9.0	10.0	18	20	2.30	2.45	41	49
Virginia	108	65	22	13	7.0	6.0	154	78	7	5	6.0	6.0	42	30	2.10	2.70	323	211
West Virginia	2	2																
North Carolina	209	114	124	68	9.0	12.0	1,116	816	53	50	6.5	9.0	344	450	1.95	2.30	2,176	1,877
South Carolina	534	388	229	165	6.0	7.0	1,374	1,155	128	116	3.0	4.5	384	522	1.55	2.30	2,130	2,656
Georgia	399	257	172	121	9.5	8.0	1,634	968	108	124	5.0	6.2	540	769	1.65	2.30	2,696	2,226
Florida	33	24	19	14	10.0	10.5	190	147	4	4	5.0	8.0	20	32	2.50	2.50	475	368
Kentucky	96	43	26	11	13.0	14.0	338	154	6	4	4.7	6.5	28	26	2.45	2.60	828	400
Tennessee	180	118	94	43	10.0	10.0	940	430	27	45	5.0	5.5	135	248	2.15	2.30	2,021	989
Alabama	228	178	178	135	10.5	11.0	1,869	1,485	75	70	4.5	5.5	338	385	1.90	2.30	3,551	3,416
Mississippi	152	114	94	75	10.0	12.0	940	900	46	46	4.5	5.3	207	244	1.95	2.40	1,833	2,160
Arkansas	179	147	73	63	11.8	10.0	861	630	48	55	3.1	2.5	149	138	1.95	2.40	1,679	1,512
Louisiana	184	138	43	32	12.5	10.5	538	336	27	23	5.0	4.0	135	92	2.30	2.65	1,237	890
Oklahoma	80	78	49	47	13.0	10.0	637	470	26	26	9.0	6.8	234	177	2.25	2.45	1,433	1,152
Texas	198	189	162	160	11.0	10.0	1,782	1,600	55	65	8.0	6.0	440	390	1.90	2.20	3,386	3,520
United States	2,987	2,117	1,391	1,059	9.6	9.6	13,352	10,149	699	735	5.3	5.8	3,724	4,269	1.93	2.31	25,721	23,442

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone. Acreage cut for hay is included in table of legume hay.
[2] Including peas grazed or otherwise utilized as well as those gathered.
[3] Acres from which all or part of the peas grown were gathered.
[4] Total production (except hay) multiplied by price of gathered peas to give approximate total value.

TABLE 302.—*Cowpeas: Estimated average price per bushel, received by producers, United States, 1915–1929*

Year beginning August—	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1915	1.74	1.55	1.56	1.51	1.52	1.56	1.57	1.54	1.50	1.49	1.40	1.35	1.52
1916	1.41	1.42	1.48	1.62	1.77	1.92	2.10	2.32	2.53	2.93	3.09	3.03	1.90
1917	2.65	2.17	2.20	2.27	2.38	2.62	2.92	3.02	2.93	2.83	2.57	2.48	2.36
1918	2.41	2.26	2.34	2.31	2.38	2.39	2.52	2.49	2.68	2.92	3.44	3.43	2.54
1919	3.10	2.69	2.61	2.71	2.81	3.13	3.72	3.94	4.21	4.84	4.84	4.71	3.19
1920	4.23	3.69	2.74	2.43	2.29	1.97	2.04	2.05	2.16	2.43	2.65	2.87	2.74
1921	2.41	2.00	2.01	1.85	1.76	1.72	1.80	1.86	1.85	1.90	1.84	1.70	1.91
1922	1.66	1.57	1.54	1.61	1.67	1.87	1.98	1.98	2.08	2.08	2.17	2.21	1.73
1923	2.08	1.87	1.94	1.95	2.01	2.12	2.21	2.32	2.46	2.53	2.82	2.86	2.14
1924	2.56	2.41	2.32	2.34	2.56	2.82	3.16	3.43	3.67	3.70	3.84	3.67	2.73
1925	3.24	3.12	2.93	2.98	2.87	3.03	3.21	3.37	3.50	3.43	3.47	3.47	3.09
1926	3.22	2.79	2.34	2.05	1.95	1.94	1.94	1.89	1.93	1.90	1.90	1.93	2.21
1927	1.84	1.80	1.70	1.72	1.65	1.71	1.74	1.76	1.86	2.00	2.09	2.09	1.80
1928	2.01	1.82	1.84	1.83	2.02	2.15	2.45	2.63	2.88	3.05	3.24	3.19	2.18
1929	2.99	2.49	2.30	2.22	2.28	2.40							

Bureau of Agricultural Economics. Based upon returns from special price reporters. Monthly prices weighted by production of cowpeas for each State: yearly price obtained by weighting monthly prices by estimated monthly marketings.

TABLE 303.—*Cowpeas for seed: Average wholesale selling price per 100 pounds at Baltimore and St. Louis, 1920–1929*

Year	Baltimore						St. Louis					
	Jan.	Feb.	Mar.	Apr.	May	Average	Jan.	Feb.	Mar.	Apr.	May	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	7.20	9.00	9.00	9.00	9.60	8.76	10.50	12.75	11.25	10.65	11.00	11.23
1921	4.50	4.50	4.50	5.30	6.20	5.00	4.00	4.20	4.45	5.05	6.50	4.84
1922	3.70	4.00	4.00	4.00	4.00	3.94	3.20	3.15	3.65	3.75	3.75	3.50
1923	4.25	4.25	4.25	4.25	4.25	4.25	5.00	4.95	4.75	4.75	4.95	4.88
1924	5.00	5.50	5.25	5.60	5.75	5.42	4.60	4.95	5.00	5.05	5.90	5.10
1925	6.50	6.50	6.50	6.50	6.55	6.51	6.50	6.70	6.80	6.80	6.80	6.72
1926		7.08	7.10	7.05	7.02		7.50	7.38	7.00	6.81	6.75	7.09
1927	3.75	3.75	3.56	3.50	3.50	3.61		4.00	4.00	4.00	4.00	
1928	3.00	3.05	3.50	3.62	3.88	3.41	4.00	4.00	4.02	4.14	4.50	4.13
1929	4.75	5.88	6.25	6.25	6.25	5.88		6.00	6.00	6.12	6.25	

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high quality seed.

TABLE 304.—*Velvetbeans: Acreage, yield per acre, and production, by States, 1927–1929*

State	Total acres for all purposes			Yield per acre of beans in the hull [1]			Total production of beans in the hull [1]		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Pounds*	*Pounds*	*Pounds*	*1,000 tons*	*1,000 tons*	*1,000 tons*
North Carolina	8	11	14	1,300	1,300	1,300	5	7	9
South Carolina	73	67	82	1,075	800	1,000	39	27	41
Georgia	993	947	1,161	900	900	900	447	426	522
Florida	107	98	110	1,000	900	900	54	44	50
Alabama	300	375	430	1,000	900	790	150	169	170
Mississippi	26	33	40	1,000	1,250	1,480	13	21	30
Louisiana	27	27	28	1,350	1,400	1,150	18	19	16
United States	1,534	1,558	1,865	946.6	915.2	898.7	726	713	838

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] The figures refer to the yield and entire production of velvet beans in the hull and not merely to those gathered. The pods are gathered from one-fourth to one-third of the acreage and most of these are ground for feed, only enough being shelled to supply seed. A large proportion of the crop is grazed.

TABLE 305.—*Broomcorn: Acreage, production, and November 15 price, United States, 1915–1929*

Year	Acreage	Average yield per acre	Production	Price per ton received by producers Nov. 15	Year	Acreage	Average yield per acre	Production	Price per ton received by producers Nov. 15
	Acres	*Pounds*	*Tons*	*Dollars*		*Acres*	*Pounds*	*Tons*	*Dollars*
1915	230, 100	454. 1	52, 242	91. 67	1923	536, 000	302. 8	81, 153	160. 06
1916	235, 200	329. 3	38, 726	172. 75	1924	436, 000	356. 7	77, 800	95. 81
1917	345, 000	332. 8	57, 400	292. 75	1925	214, 000	275. 7	29, 500	[1] 143. 02
1918	366, 000	340. 4	62, 300	233. 87	1926	306, 000	355. 6	54, 400	[2] 78. 77
1919	352, 000	303. 4	53, 400	154. 57	1927	237, 000	337. 6	40, 000	[2] 109. 50
1920	275, 500	265. 0	36, 500	126. 16	1928	298, 000	363. 1	54, 100	[2] 104. 21
1921	222, 000	344. 2	38, 200	72. 20	1929 [3]	284, 000	308. 5	43, 800	[2] 121. 89
1922	275, 000	271. 3	37, 300	219. 46					

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Weighted average of the season to Dec. 1. [2] Dec. 1 price. [3] Preliminary.

TABLE 306.—*Broomcorn: Acreage, production, and December 1 price, by States, 1926–1929*

State	Acreage				Average yield per acre				Production				Price per ton received by producers Dec. 1			
	1926	1927	1928	1929 [1]	1926	1927	1928	1929	1926	1927	1928	1929 [1]	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Tons*	*Tons*	*Tons*	*Tons*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
Ill	40	28	21	21	420	380	440	425	8, 400	5, 300	4, 600	4, 500	115	155	145	175
Mo	3	3	4	4	250	400	430	380	400	600	900	800	87	90	90	100
Kans	31	27	43	42	327	375	450	340	5, 100	5, 100	9, 700	7, 100	85	96	96	115
Okla	158	112	131	115	375	349	350	262	29, 600	19, 500	22, 900	15, 100	70	98	111	120
Tex	15	10	9	7	410	260	311	350	3, 100	1, 300	1, 400	1, 200	75	110	107	112
Colo	30	35	52	55	225	330	360	330	3, 400	5, 800	9, 400	9, 100	83	120	85	112
N. Mex	29	22	38	40	300	220	272	300	4, 400	2, 400	5, 200	6, 000	60	110	90	115
U. S	306	237	298	284	355. 6	337. 6	363. 1	308. 5	54, 400	40, 000	54, 100	43, 800	78. 77	109. 50	104. 21	121. 89

Bureau of Agricultural Economics. Estimates of the crop reporting board.

[1] Preliminary.

TABLE 307.—*Broomcorn: Supply and distribution, 1923–1929*

	Crop year June 1 to May 31						
	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30
Supply:							
Stocks June 1—							
Manufacturers	[1] 8, 018	15, 169	20, 960	16, 201	18, 173	18, 744	19, 591
Dealers [2]	2, 421	15, 489	25, 043	9, 706	11, 498	5, 938	7, 495
On farms	(3)	6, 133	6, 024	3, 265	2, 709	1, 206	823
Total carry-over	10, 439	36, 791	52, 027	29, 172	32, 380	25, 888	27, 909
Production	81, 153	78, 200	29, 500	54, 400	40, 000	54, 500	[4] 46, 200
Imports	550	136	(3)	(3)	193	(3)	----------
Total supply available	92, 142	115, 127	81, 527	83, 572	72, 573	80, 388	----------
Distribution:							
Exports [5]	5, 099	5, 580	4, 688	4, 701	4, 367	4, 931	----------
Domestic use	50, 252	[6] 57, 520	47, 667	46, 491	42, 318	47, 458	----------
Stocks on hand May 31	36, 791	52, 027	29, 172	32, 380	25, 888	27, 909	----------

Bureau of Agricultural Economics.

[1] In June, 1923, about 30 per cent of the manufacturers reported idle account lack of working stocks.
[2] Storage stocks reported by dealers include manufacturers' stocks held by dealers at country shipping points.
[3] Less than 100 tons. [4] Oct. 1 estimate. [5] For crop year, June 1–May 31.
[6] Includes waste and broomcorn destroyed by warehouse fire.

TABLE 308.—*Hay: Acreage, yield, and production, by States, averages and annual, 1928 and 1929*

State and division	Acreage						Yield per acre						Production					
	Tame hay			Wild hay			Tame hay			Wild hay			Tame hay			Wild hay		
	Average 1923–1927	1928	1929 [1]	Average 1923–1927	1928	1929 [1]	Average 1918–1927	1928	1929	Average 1918–1927	1928	1929	Average 1923–1927	1928	1929 [1]	Average 1923–1927	1928	1929 [1]
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Maine	1, 261	1, 235	1, 221	14	13	13	1. 13	1. 28	1. 30	0. 98	1. 05	1. 10	1, 500	1, 583	1, 582	13	14	14
New Hampshire	462	459	461	16	16	16	1. 16	1. 41	1. 44	. 93	1. 15	1. 00	551	647	663	15	18	16
Vermont	925	914	914	13	13	13	1. 42	1. 62	1. 67	1. 04	1. 30	1. 10	1, 401	1, 480	1, 528	14	17	14
Massachusetts	464	460	466	13	12	12	1. 32	1. 56	1. 48	1. 02	1. 25	1. 10	619	717	692	13	15	13
Rhode Island	45	43	43	2	2	2	1. 30	1. 56	1. 44	. 92	1. 10	1. 15	58	67	62	2	2	2
Connecticut	352	354	354	11	10	10	1. 30	1. 61	1. 46	1. 07	1. 36	1. 10	457	570	516	12	13	11
New York	4, 907	4, 597	4, 629	68	68	68	1. 33	1. 40	1. 44	1. 15	1. 09	1. 25	6, 891	6, 439	6, 653	79	74	85
New Jersey	268	247	242	17	16	17	1. 54	1. 83	1. 50	1. 36	1. 65	1. 50	412	453	362	25	26	26
Pennsylvania	3, 010	2, 924	2, 872	20	15	14	1. 40	1. 59	1. 49	1. 23	1. 45	1. 30	4, 234	4, 636	4, 280	26	22	18
North Atlantic	11, 694	11, 233	11, 202	173	165	165	1. 33	1. 48	1. 46	1. 12	1. 22	1. 21	16, 123	16, 592	16, 338	197	201	199
Ohio	3, 138	2, 780	3, 056	5	7	6	1. 38	1. 33	1. 64	1. 31	1. 13	1. 50	4, 341	3, 698	5, 009	6	8	9
Indiana	2, 088	1, 864	2, 163	22	20	16	1. 29	1. 37	1. 63	1. 13	1. 15	1. 40	2, 708	2, 558	3, 517	24	23	22
Illinois	3, 306	3, 115	3, 557	42	41	37	1. 31	1. 32	1. 56	1. 21	1. 12	1. 30	4, 362	4, 108	5, 554	50	46	48
Michigan	2, 998	2, 832	2, 989	44	38	40	1. 27	1. 51	1. 68	1. 19	1. 31	1. 57	4, 039	4, 277	5, 022	51	50	63
Wisconsin	3, 336	3, 278	3, 442	251	207	211	1. 65	1. 51	2. 15	1. 34	1. 35	1. 40	5, 768	4, 957	7, 390	333	279	295
Minnesota	2, 245	2, 355	2, 499	1, 945	1, 809	1, 827	1. 61	1. 81	1. 78	1. 23	1. 20	1. 10	3, 672	4, 269	4, 457	2, 265	2, 171	2, 010
Iowa	3, 156	2, 880	3, 286	322	264	280	1. 50	1. 48	1. 93	1. 16	1. 16	1. 35	4, 779	4, 276	6, 342	359	306	378
Missouri	3, 376	3, 571	3, 899	139	143	157	1. 22	1. 28	1. 34	1. 05	1. 10	1. 00	4, 280	4, 567	5, 211	150	157	157
North Dakota	1, 054	1, 080	1, 304	1, 659	1, 210	1, 367	1. 41	1. 88	1. 17	. 96	1. 12	. 70	1, 593	2, 028	1, 529	1, 605	1, 335	957
South Dakota	1, 143	1, 083	1, 151	2, 969	2, 107	2, 634	1. 64	1. 52	1. 70	. 89	. 60	. 65	1, 751	1, 655	1, 955	2, 509	1, 264	1, 712
Nebraska	1, 669	1, 550	1, 532	2, 792	2, 903	3, 048	2. 13	2. 16	2. 33	. 91	. 87	. 87	3, 780	3, 351	3, 572	2, 512	2, 526	2, 652
Kansas	1, 632	1, 496	1, 382	934	900	900	2. 04	2. 37	2. 09	1. 01	1. 23	1. 20	3, 472	3, 539	2, 891	966	1, 107	1, 080
North Central	29, 170	27, 887	30, 260	11, 123	9, 649	10, 523	1. 49	1. 55	1. 73	1. 00	. 96	. 89	44, 594	43, 283	52, 449	10, 831	9, 292	9, 383
Delaware	78	81	81	3	2	2	1. 42	1. 70	1. 44	1. 34	1. 60	1. 70	114	138	117	5	3	3
Maryland	413	430	420	4	3	3	1. 43	1. 75	1. 54	1. 26	1. 68	1. 45	597	754	648	5	5	4
Virginia	1, 026	1, 063	1, 037	19	21	21	1. 16	1. 37	1. 32	1. 03	1. 33	1. 30	1, 134	1, 451	1, 373	20	28	27
West Virginia	799	814	805	12	12	12	1. 32	1. 45	1. 43	1. 17	1. 33	1. 20	1, 080	1, 183	1, 149	15	16	14
North Carolina	751	797	813	66	52	52	1. 04	. 95	. 95	. 98	1. 15	1. 15	711	756	776	61	60	60

South Carolina	336	434	365	4	6	3	.80	.87	.86	.83	.60	.85	229	376	313	2	4	3
Georgia	673	792	691	18	19	19	.77	.62	.61	.83	.80	.75	407	490	423	13	15	14
Florida	95	88	86	4	4	4	.82	.73	.71	.90	.85	.70	73	64	61	4	3	3
South Atlantic	4, 171	4, 499	4, 298	130	119	116	1. 10	1. 16	1. 13	1. 00	1. 13	1. 10	4, 343	5, 212	4, 860	124	134	128
Kentucky	1, 147	1, 244	1, 243	25	58	29	1. 31	1. 31	1. 42	1. 10	1. 40	1. 35	1, 536	1, 631	1, 763	30	81	39
Tennessee	1, 327	1, 271	1, 472	49	50	48	1. 19	1. 33	1. 31	1. 06	1. 20	1. 10	1, 515	1, 690	1, 933	51	60	53
Alabama	622	590	590	23	22	18	.84	.77	.77	.82	.75	.80	485	457	453	16	16	14
Mississippi	424	458	442	37	35	37	1. 18	1. 27	1. 26	1. 04	1. 00	.90	480	581	559	34	35	33
Arkansas	596	625	603	136	131	151	1. 18	1. 09	1. 05	1. 00	.85	.80	647	683	631	126	111	121
Louisiana	249	297	285	18	18	22	1. 22	1. 43	1. 14	1. 15	1. 38	1. 20	272	424	326	18	25	26
Oklahoma	620	576	668	518	492	556	1. 57	1. 46	1. 31	.94	1. 00	.88	971	841	875	473	492	489
Texas	628	637	658	217	219	241	1. 31	1. 15	1. 13	.99	.95	1. 02	779	733	744	207	208	246
South Central	5, 612	5, 698	5, 961	1, 022	1, 025	1, 102	1. 23	1. 24	1. 22	.97	1. 00	.93	6, 686	7, 040	7, 284	955	1, 028	1, 021
Montana	1, 234	1, 294	1, 446	647	606	636	1. 69	1. 98	1. 42	.84	.90	.75	2, 216	2, 558	2, 050	619	545	477
Idaho	1, 041	1, 047	1, 095	107	101	101	2. 71	2. 53	2. 51	1. 22	1. 20	1. 20	2, 856	2, 645	2, 751	134	121	121
Wyoming	681	681	693	371	401	401	1. 85	1. 80	1. 73	.99	1. 05	.95	1, 281	1, 224	1, 196	379	421	381
Colorado	1, 231	1, 187	1, 203	370	376	387	2. 15	2. 08	2. 23	.99	.90	1. 10	2, 635	2, 467	2, 677	374	338	426
New Mexico	176	186	197	33	33	34	2. 21	2. 19	2. 27	.86	.90	.90	397	407	447	30	30	31
Arizona	170	185	193	7	10	10	3. 43	3. 77	3. 52	.90	.50	1. 00	606	697	679	7	5	10
Utah	551	570	578	83	77	79	2. 59	2. 46	2. 60	1. 28	1. 30	1. 60	1, 512	1, 400	1, 500	115	100	126
Nevada	203	208	211	161	160	158	2. 51	2. 60	2. 35	1. 02	1. 20	.90	501	541	496	168	192	142
Washington	945	906	945	29	31	28	2. 12	2. 36	1. 98	1. 36	1. 50	1. 40	2, 105	2, 140	1, 875	42	46	39
Oregon	934	905	931	210	235	235	1. 98	2. 26	2. 08	1. 09	1. 20	1. 20	1, 863	2, 041	1, 935	237	282	282
California	1, 833	1, 654	1, 783	142	150	150	2. 46	3. 09	2. 90	1. 07	1. 20	1. 05	5, 093	5, 104	5, 178	157	180	158
Far Western	8, 999	8, 823	9, 275	2, 161	2, 180	2, 219	2. 23	2. 41	2. 24	1. 00	1. 04	.99	21, 064	21, 224	20, 784	2, 261	2, 260	2, 193
United States	59, 646	58, 140	60, 996	14, 609	13, 138	14, 125	1. 52	1. 61	1. 67	1. 00	.98	.91	92, 810	93, 351	101, 715	14, 368	12, 915	12, 924

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 309.—*Hay: Acreage, production, December 1 price, exports, etc., United States, 1909–1929*

Year	Tame hay						Wild hay			
	Acreage	Average yield per acre	Production	Price per ton received by producers, Dec. 1	Domestic exports, year beginning July 1 [1]	Imports, year beginning July 1 [1]	Acreage	Yield per acre	Production	Price per ton received by producers, Dec. 1
	1,000 acres	*Short tons*	*1,000 short tons*	*Dollars*	*1,000 short tons*	*1,000 short tons*	*1,000 acres*	*Short tons*	*1,000 short tons*	*Dollars*
1909	*51,041*	*1.35*	*68,833*							
1909	51,041	1.46	74,384	10.58	62	108	*17,187*	1.07	18,383	
1910	51,015	1.36	69,378	12.14	62	377	17,187	.77	13,151	
1911	48,240	1.14	54,916	14.29	67	783	17,187	.71	12,155	
1912	49,530	1.47	72,691	11.79	68	175	17,427	1.04	18,043	
1913	48,954	1.31	64,116	12.43	56	191	16,341	.92	15,063	
1914	49,145	1.43	70,071	11.12	118	23	16,752	1.11	18,615	7.49
1915	51,108	1.68	85,920	10.63	200	48	16,796	1.27	21,343	6.80
1916	55,721	1.64	91,192	11.22	96	65	16,635	1.19	19,800	7.90
1917	55,203	1.51	83,308	17.09	34	460	16,212	.93	15,131	13.49
1918	55,755	1.37	76,660	20.13	32	311	15,365	.94	14,479	15.23
1919	*55,653*	*1.34*	*74,724*							
1919	56,888	1.53	86,997	20.05	67	252	17,150	1.07	18,401	16.50
1920	58,101	1.55	89,785	17.66	55	126	15,787	1.11	17,460	11.35
1921	58,769	1.40	82,458	12.10	61	5	15,632	.98	15,391	6.63
1922	61,159	1.57	95,748	12.55	53	35	15,871	1.02	16,131	7.14
1923	59,868	1.49	89,250	14.13	24	403	15,556	1.12	17,361	7.88
1924	*59,073*									
1924	60,907	1.60	97,224	13.76	25	119	15,205	.98	14,859	7.83
1925	58,013	1.47	85,431	13.93	18	431	14,560	.87	12,724	8.53
1926	58,558	1.47	86,144	14.10	15	209	12,911	.74	9,568	10.05
1927	60,885	1.74	106,001	11.35	17	84	14,813	1.17	17,326	6.59
1928	58,140	1.61	93,351	12.27	14	40	13,138	.98	12,915	7.35
1929 [2]	60,996	1.67	101,715	12.23			14,125	.91	12,924	8.11

Bureau of Agricultural Economics. Italic figures are census returns; other acreage, production, and yield figures are estimates of the crop-reporting board. See 1927 Yearbook, p. 927, for data for earlier years.

[1] Compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce.

[2] Preliminary.

TABLE 310.—*Hay: Production of alfalfa, timothy, and mixed, by States, 1927–1929*

State and division	Alfalfa hay			Timothy hay			Clover and timothy hay mixed		
	1927	1928	1929 [1]	1927	1928	1929 [1]	1927	1928	1929 [1]
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
Maine	8	9	6	174	185	173	784	804	815
New Hampshire	8	8	7	62	68	60	239	265	262
Vermont	20	18	20	204	217	212	874	919	977
Massachusetts	9	9	7	90	96	80	211	231	200
Rhode Island				7	6	6	23	23	22
Connecticut	16	17	16	61	65	52	120	122	120
New York	569	541	546	1,617	1,412	1,403	3,532	2,949	2,874
New Jersey	69	69	49	88	80	63	239	230	184
Pennsylvania	208	218	211	1,736	1,466	1,162	2,498	2,347	2,289
North Atlantic	907	889	862	4,039	3,595	3,211	8,520	7,890	7,743
Ohio	441	344	497	1,587	1,211	1,330	2,030	1,352	2,021
Indiana	356	336	402	668	721	507	922	640	942
Illinois	538	480	586	950	658	660	1,384	1,049	1,611
Michigan	1,103	1,140	1,254	508	446	381	2,053	1,783	2,150
Wisconsin	780	548	922	584	635	504	3,401	2,498	3,382
Minnesota	1,514	1,569	1,551	493	337	358	1,480	1,132	1,260
Iowa	843	958	1,271	710	678	678	2,140	1,624	2,678
Missouri	415	382	397	1,452	1,121	1,140	1,505	1,226	1,525
North Dakota	413	510	384	99	78	49	55	38	34
South Dakota	1,665	1,125	1,430	78	51	44	71	52	82
Nebraska	3,297	2,633	2,759	36	27	28	100	103	105
Kansas	2,824	2,250	1,747	142	113	79	106	93	71
North Central	14,189	12,266	13,200	7,307	6,079	5,758	15,247	11,590	15,861
Delaware	14	17	11	14	15	11	50	46	36
Maryland	69	62	50	106	98	89	309	319	291
Virginia	108	122	127	192	191	181	409	400	394
West Virginia	16	18	20	348	302	247	546	502	522
North Carolina	11	18	29	21	23	22	49	47	50
South Carolina	3	6	5						
Georgia	6	8	7	2	2	3	2	2	3
South Atlantic	218	251	249	683	631	553	1,365	1,316	1,296
Kentucky	143	142	155	241	173	150	296	231	322
Tennessee	37	33	42	122	121	133	302	289	345
Alabama	22	22	22						
Mississippi	23	68	88				7	8	6
Arkansas	60	115	94	35	22	24	96	65	76
Louisiana	36	41	40						
Oklahoma	464	402	442	17	15	14	14	14	12
Texas	164	152	179						
South Central	949	975	1,062	415	331	321	715	607	761
Montana	1,775	1,619	1,376	162	159	111	300	292	208
Idaho	2,420	1,983	2,061	108	84	84	234	213	205
Wyoming	795	798	806	41	39	38	129	144	118
Colorado	2,047	1,806	1,962	68	56	60	218	228	252
New Mexico	322	305	331	8	6	6	7	6	8
Arizona	588	630	615						
Utah	1,350	1,275	1,364	16	13	16	44	42	51
Nevada	409	441	397	15	15	15	21	21	23
Washington	858	874	715	158	162	131	382	353	298
Oregon	792	777	672	32	28	28	141	138	133
California	4,204	4,246	4,175	6	6	6	30	34	34
Far western	15,560	14,754	14,474	614	568	495	1,506	1,471	1,330
United States	31,823	29,135	29,847	13,058	11,204	10,338	27,353	22,874	26,991

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 311.—*Hay, tame, by kinds: Acreage, yield per acre, and production, United States, 1919–1929*

ACREAGE

Year	Alfalfa	Clover (red, alsike, and crimson)	Sweet clover	Lespedeza (Japan clover)	Clover and timothy mixed	Timothy	Grains cut green	Annual legumes	Millet, Johnson, Sudan grass and other	All tame
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
1919	8, 750	[1] 7, 434			14, 739	11, 398	5, 266	2, 619	6, 682	56, 888
1920	9, 131	[1] 7, 659			15, 632	11, 416	4, 704	2, 756	6, 803	58, 101
1921	9, 228	[1] 7, 637			15, 430	11, 489	4, 925	3, 048	7, 012	58, 769
1922	9, 368	[1] 9, 079			16, 100	11, 409	4, 560	3, 510	7, 133	61, 159
1923	9, 816	[1] 8, 091			15, 596	11, 104	4, 295	3, 828	7, 138	59, 868
1924	10, 759	7, 412	790	344	17, 476	9, 566	3, 278	3, 710	7, 572	60, 907
1925	10, 852	6, 927	921	300	16, 684	8, 783	3, 319	3, 053	7, 174	58, 013
1926	11, 076	5, 637	1, 029	330	15, 762	9, 561	4, 320	3, 370	7, 473	58, 558
1927	11, 401	6, 689	1, 128	361	16, 825	9, 116	3, 133	4, 344	7, 888	60, 885
1928	11, 067	5, 081	1, 212	366	16, 009	8, 979	2, 927	4, 427	8, 072	58, 140
1929 [2]	11, 505	7, 526	1, 298	361	16, 758	7, 733	3, 526	4, 078	8, 211	60, 996

YIELD PER ACRE

Year	Alfalfa	Clover (red, alsike, and crimson)	Sweet clover	Lespedeza (Japan clover)	Clover and timothy mixed	Timothy	Grains cut green	Annual legumes	Millet, Johnson, Sudan grass and other	All tame
	Tons	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*	*Tons*
1919	2. 56	[1] 1. 48			1. 44	1. 34	1. 12	0. 99	1. 28	1. 53
1920	2. 71	[1] 1. 42			1. 37	1. 33	1. 31	1. 06	1. 24	1. 55
1921	2. 57	[1] 1. 21			1. 17	1. 17	1. 31	. 99	1. 21	1. 40
1922	2. 61	[1] 1. 50			1. 47	1. 33	1. 25	1. 09	1. 31	1. 57
1923	2. 65	[1] 1. 33			1. 30	1. 15	1. 37	1. 05	1. 34	1. 49
1924	2. 49	1. 61	1. 80	0. 94	1. 58	1. 38	1. 14	. 88	1. 20	1. 60
1925	2. 62	1. 33	1. 73	. 88	1. 27	1. 07	1. 46	. 85	1. 09	1. 47
1926	2. 48	1. 38	1. 53	1. 18	1. 30	1. 16	1. 18	1. 09	1. 14	1. 47
1927	2. 79	1. 75	2. 02	1. 30	1. 63	1. 43	1. 49	1. 10	1. 25	1. 74
1928	2. 63	1. 58	2. 05	1. 25	1. 43	1. 25	1. 44	1. 15	1. 22	1. 61
1929 [2]	2. 59	1. 78	1. 81	1. 17	1. 61	1. 34	1. 28	1. 06	1. 16	1. 67

PRODUCTION

Year	Alfalfa	Clover (red, alsike, and crimson)	Sweet clover	Lespedeza (Japan clover)	Clover and timothy mixed	Timothy	Grains cut green	Annual legumes	Millet, Johnson, Sudan grass and other	All tame
	1,000 tons	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*	*1,000 tons*
1919	22, 364	[1] 11, 030			21, 282	15, 238	5, 909	2, 599	8, 575	86, 997
1920	24, 758	[1] 10, 864			21, 407	15, 211	6, 177	2, 925	8, 443	89, 785
1921	23, 705	[1] 9, 237			18, 028	13, 486	6, 475	3, 020	8, 507	82, 458
1922	24, 434	[1] 13, 603			23, 649	15, 176	5, 715	3, 813	9, 358	95, 748
1923	25, 990	[1] 10, 789			20, 216	12, 776	5, 876	4, 037	9, 566	89, 250
1924	26, 786	11, 935	1, 420	325	27, 528	13, 179	3, 734	3, 267	9, 050	97, 224
1925	28, 439	9, 201	1, 594	263	21, 271	9, 400	4, 835	2, 593	7, 835	85, 431
1926	27, 505	7, 769	1, 574	390	20, 520	11, 073	5, 107	3, 669	8, 537	86, 144
1927	31, 823	11, 727	2, 274	469	27, 353	13, 058	4, 655	4, 787	9, 855	106, 001
1928	29, 135	8, 047	2, 483	457	22, 874	11, 204	4, 202	5, 102	9, 847	93, 351
1929 [2]	29, 847	13, 390	2, 350	422	26, 991	10, 338	4, 522	4, 323	9, 532	101, 715

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] All clover hay. [2] Preliminary.

TABLE 312.—*Hay, all: Stocks on farms, United States, May 1, 1910–1929*

Year	Production of all hay preceding year	Stocks on farms May 1: Per cent	Stocks on farms May 1: Stocks	Price per ton May 1 [1]	Year	Production of all hay preceding year	Stocks on farms May 1: Per cent	Stocks on farms May 1: Stocks	Price per ton May 1 [1]
	1,000 short tons		*1,000 short tons*	*Dollars*		*1,000 short tons*		*1,000 short tons*	*Dollars*
1910	92, 767	11. 6	10, 745	11. 08	1920	105, 398	10. 2	10, 707	24. 22
1911	82, 529	12. 4	10, 222	11. 69	1921	107, 245	17. 9	19, 160	13. 08
1912	67, 071	8. 5	5, 732	16. 31	1922	97, 849	11. 2	10, 969	12. 98
1913	90, 734	14. 9	13, 523	10. 42	1923	111, 879	12. 0	13, 379	12. 69
1914	79, 179	12. 2	9, 631	11. 63	1924	106, 611	12. 0	12, 835	13. 69
1915	88, 686	12. 2	10, 797	11. 03	1925	112, 083	13. 9	15, 598	12. 32
1916	107, 263	13. 5	14, 452	11. 27	1926	98, 155	11. 7	11, 455	12. 95
1917	110, 992	11. 4	12, 659	13. 94	1927	95, 712	11. 2	10, 746	13. 23
1918	98, 439	11. 7	11, 476	17. 97	1928	123, 327	14. 5	17, 896	10 50
1919	91, 139	9. 4	8, 559	22. 31	1929	106, 266	10. 5	11, 159	

Bureau of Agricultural Economics. Production and stocks are estimates of the crop-reporting board; prices are based upon returns from special price reporters.

[1] Prices 1923–1928 are the mean of Apr. 15 and May 15.

TABLE 313.—*Hay: Receipts at 11 markets, 1908–1928*

Year beginning July	Baltimore	Boston	Chicago	Kansas City	Minneapolis	New York	Philadelphia	St. Louis	San Francisco	Cincinnati	Los Angeles	Omaha
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1908	56, 151	129, 450	277, 746	179, 928	31, 880	338, 153	92, 304	208, 025	164, 648	------	------	------
1909	58, 877	142, 930	256, 269	232, 368	26, 310	334, 760	83, 233	200, 456	168, 220	------	------	------
1910	68, 273	162, 420	272, 104	308, 940	66, 300	338, 860	81, 529	253, 932	184, 594	166, 566	------	------
1911	68, 235	163, 220	352, 324	318, 948	63, 570	292, 411	95, 715	259, 642	147, 483	106, 863	------	------
1912	59, 785	139, 370	276, 187	343, 392	37, 290	309, 322	81, 853	229, 713	141, 224	165, 760	------	------
1913	61, 823	115, 430	371, 120	285, 288	38, 280	318, 528	75, 614	262, 855	129, 147	230, 456	------	------
1914	55, 623	116, 020	320, 071	398, 604	45, 513	329, 686	78, 583	299, 550	161, 739	204, 117	------	------
1915	50, 042	126, 400	280, 224	398, 172	45, 306	296, 200	88, 780	223, 815	145, 373	139, 419	------	------
1916	50, 794	123, 580	239, 062	359, 316	35, 652	214, 064	79, 006	209, 902	108, 455	233, 585	------	------
1917	63, 799	95, 170	351, 972	419, 964	39, 126	200, 197	60, 296	238, 144	86, 228	222, 679	------	------
1918	42, 249	70, 660	287, 217	386, 460	29, 769	217, 300	31, 487	202, 812	80, 233	125, 605	------	------
1919	32, 059	57, 270	225, 217	617, 052	22, 607	170, 742	49, 868	256, 112	80, 775	112, 130	------	------
1920	19, 223	82, 200	149, 718	363, 900	23, 118	146, 734	40, 036	179, 633	67, 953	83, 901	------	------
1921	14, 158	51, 080	142, 753	225, 516	23, 718	102, 381	51, 262	119, 991	59, 185	71, 577	------	------
1922	16, 081	49, 190	150, 342	261, 084	25, 956	98, 841	42, 246	138, 961	60, 017	64, 893	------	------
1923	25, 664	42, 910	146, 496	290, 676	30, 432	85, 644	49, 734	138, 540	113, 235	76, 605	------	------
1924	13, 635	46, 710	155, 158	316, 932	28, 093	64, 332	32, 824	142, 184	50, 159	95, 760	104, 772	62, 520
1925	15, 839	38, 430	175, 885	341, 892	29, 761	66, 587	33, 199	127, 060	54, 629	43, 752	145, 584	62, 268
1926	11, 547	30, 680	130, 665	277, 020	38, 187	54, 363	29, 539	85, 844	[1] 23,165	46, 056	95, 496	75, 936
1927	6, 438	25, 990	104, 241	246, 456	17, 214	42, 921	22, 397	72, 870	38, 157	71, 052	77, 748	64, 800
1928	2, 435	21, 790	98, 672	248, 124	17, 197	24, 862	18, 706	66, 360	30, 530	79, 152	63, 504	76, 488

Bureau of Agricultural Economics. Compiled as follows: Baltimore, Baltimore Chamber of Commerce annual reports; Boston, Boston Chamber of Commerce annual reports, 1909–1918; Chicago, Board of Trade annual reports; Kansas City, Board of Trade annual reports; Milwaukee, Chamber of Commerce annual reports, except 1923 and 1924; Minneapolis, Chamber of Commerce annual reports; New York, New York Produce Exchange; Peoria, Board of Trade annual reports, 1909–1918; St. Louis, Trade and Commerce of St. Louis, 1909–1923, subsequently Daily Market Reporter; San Francisco, Chamber of Commerce annual reports, 1909–1920; other data from Hay Trade Journal, weekly, and American Elevator and Grain Trade.

[1] Total for 6 months; not reported July–December, 1926.

TABLE 314.—*Hay, tame: Estimated price per ton, received by producers, December 1, average 1923–1927 and annual 1925–1929*

State	Av., 1923-1927	1925	1926	1927	1928	1929	State	Av., 1923-1927	1925	1926	1927	1928	1929
	Dols.	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*		*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*	*Dols.*
Me	12. 88	12. 00	13. 20	12. 70	11. 40	11. 00	N. C	20. 20	22. 00	20. 00	18. 00	17. 30	17. 80
N. H	18. 26	18. 50	19. 00	16. 30	14. 10	13. 50	S. C	19. 60	20. 00	20. 00	18. 00	18. 50	19. 20
Vt	14. 40	13. 20	14. 50	11. 70	11. 60	11. 00	Ga	18. 64	21. 00	18. 00	16. 30	15. 60	16. 30
Mass	23. 58	23. 00	23. 90	21. 00	19. 10	19. 20	Fla	20. 64	23. 00	22. 00	18. 20	19. 00	17. 50
R. I	24. 26	23. 50	25. 00	22. 00	22. 00	22. 00	Ky	16. 98	18. 70	16. 70	14. 50	16. 50	15. 70
Conn	24. 18	24. 50	25. 70	21. 70	18. 90	19. 10	Tenn	18. 42	22. 00	16. 60	15. 00	16. 90	17. 50
N. Y	14. 32	14. 60	15. 00	11. 30	11. 30	12. 20	Ala	18. 10	20. 00	18. 00	15. 00	15. 80	16. 20
N. J	20. 74	20. 00	20. 30	17. 50	14. 60	18. 60	Miss	16. 34	17. 70	16. 00	15. 00	15. 20	15. 50
Pa	17. 30	17. 00	18. 50	13. 50	12. 50	13. 10	Ark	16. 08	18. 00	16. 00	14. 00	14. 40	16. 00
Ohio	13. 58	15. 20	14. 00	9. 20	11. 70	10. 00	La	16. 02	19. 00	14. 50	13. 80	14. 40	13. 60
Ind	13. 60	15. 50	14. 00	10. 40	12. 00	10. 10	Okla	13. 26	16. 00	12. 00	10. 70	12. 70	13. 70
Ill	14. 32	15. 90	16. 00	11. 40	12. 90	11. 30	Tex	15. 08	18. 80	12. 00	11. 80	13. 20	13. 30
Mich	13. 58	16. 50	13. 80	11. 00	11. 60	10. 70	Mont	9. 56	10. 00	10. 50	8. 40	8. 90	12. 40
Wis	14. 16	14. 00	15. 00	12. 50	14. 40	10. 50	Idaho	9. 46	8. 50	9. 00	8. 70	11. 00	10. 80
Minn	11. 40	11. 00	14. 20	9. 00	9. 70	10. 60	Wyo	9. 16	8. 90	8. 50	9. 00	10. 10	12. 20
Iowa	13. 08	13. 50	15. 50	12. 50	13. 00	11. 00	Colo	10. 42	12. 00	8. 60	9. 20	11. 70	11. 50
Mo	12. 04	12. 80	13. 50	9. 90	10. 60	10. 40	N. Mex	14. 36	15. 00	12. 00	13. 40	16. 90	18. 10
N. Dak	8. 08	7. 20	11. 00	7. 80	6. 70	8. 50	Ariz	15. 14	17. 00	13. 00	14. 40	18. 00	18. 00
S. Dak	9. 72	11. 00	13. 00	7. 60	8. 20	8. 70	Utah	9. 42	9. 00	8. 00	9. 20	11. 70	10. 40
Nebr	10. 88	12. 10	14. 00	8. 50	10. 00	10. 50	Nev	10. 94	9. 00	10. 50	10. 00	12. 20	15. 60
Kans	11. 10	12. 10	13. 00	8. 60	9. 40	11. 80	Wash	13. 82	15. 00	13. 70	12. 90	13. 10	16. 80
Del	18. 60	20. 00	18. 50	16. 50	16. 40	17. 50	Oreg	11. 62	11. 60	11. 00	11. 20	11. 70	14. 60
Md	18. 88	19. 00	20. 00	15. 40	13. 50	13. 70	Calif	14. 90	14. 00	12. 30	12. 50	14. 50	16. 40
Va	18. 86	21. 00	19. 50	16. 00	15. 30	15. 50							
W. Va	18. 38	20. 00	19. 40	15. 00	14. 70	15. 10	U. S	13. 45	13. 93	14. 10	11. 35	12. 27	12. 23

Bureau of Agricultural Economics. As reported by crop reporters.

TABLE 315.—*Hay, all (loose): Estimated average price per ton, received by producers, United States, 1909–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	10.12	9.70	9.85	10.19	10.42	10.48	10.90	11.48	11.57	11.30	10.96	10.80	10.58
1910	10.75	10.98	11.16	11.16	11.67	11.92	11.74	11.68	11.46	11.52	12.04	12.78	11.54
1911	13.51	13.73	13.58	13.57	13.95	14.02	14.07	14.52	15.15	15.98	16.26	15.27	14.36
1912	13.18	11.62	11.12	11.05	11.44	11.45	10.98	10.74	10.52	10.42	10.48	10.51	11.17
1913	10.45	10.74	11.24	11.48	11.97	12.06	11.68	11.68	11.60	11.58	11.64	11.46	11.49
1914	11.02	10.93	11.03	10.87	10.95	10.80	10.65	10.86	10.94	11.00	11.10	11.00	10.92
1915	10.52	10.07	9.89	9.90	9.92	9.97	10.31	10.65	10.80	11.06	11.37	11.28	10.34
1916	10.50	9.80	9.68	9.82	10.31	10.74	11.10	11.44	12.04	13.24	14.31	14.32	11.21
1917	13.43	13.08	13.54	14.50	15.85	17.32	18.48	19.01	18.91	18.32	17.55	16.60	16.60
1918	16.00	16.67	17.94	18.86	19.31	19.64	19.86	19.80	20.17	21.42	22.80	22.52	19.88
1919	20.94	20.34	20.16	19.58	19.40	20.00	21.16	22.04	22.62	23.58	24.54	24.24	21.34
1920	22.26	20.38	19.41	18.20	17.08	16.43	15.70	14.76	13.94	13.34	12.80	12.56	16.51
1921	12.17	11.72	11.53	11.24	11.19	11.29	11.34	11.58	12.05	12.64	12.82	12.28	11.83
1922	11.44	10.78	10.68	10.87	11.38	11.82	11.98	12.04	12.18	12.54	12.82	12.32	11.68
1923	11.78	11.98	12.25	12.44	12.75	13.15	13.59	13.60	13.63	13.73	13.65	13.75	12.93
1924	13.49	12.95	12.68	12.64	12.88	12.69	12.70	12.83	12.39	12.48	12.17	11.82	12.76
1925	12.48	12.25	12.42	12.47	13.07	13.40	13.31	13.03	12.97	12.78	13.12	12.98	12.83
1926	12.96	13.04	12.88	13.08	13.22	13.47	13.38	13.64	13.48	13.26	13.20	13.10	13.23
1927	11.71	9.97	10.51	10.63	10.54	10.55	10.60	10.24	10.19	10.29	10.70	11.01	10.57
1928	10.86	10.39	10.59	10.60	10.89	11.23	11.61	12.06	12.37	12.30	12.15	11.88	11.29
1929	11.17	10.85	11.05	11.07	11.18	11.04	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of all loose hay for each State; yearly price obtained by weighting monthly prices by monthly marketings. Mean of prices reported on 1st of month and 1st of succeeding month, July, 1909–December, 1923.

TABLE 316.—*Hay, alfalfa: Estimated average price per ton received by producers, United States, 1914–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914	8.65	8.38	8.72	8.96	9.20	9.05	9.48	9.32	9.79	9.81	9.58	8.50	9.12
1915	8.28	8.28	8.22	8.14	8.72	9.52	9.89	10.35	10.74	10.73	10.56	10.49	9.39
1916	9.87	9.80	10.06	10.25	11.37	12.31	12.79	13.63	14.68	17.68	17.92	16.77	12.76
1917	14.13	15.28	16.33	17.59	19.19	20.39	21.27	21.38	20.82	18.97	17.84	16.74	18.42
1918	16.58	18.22	19.72	20.23	20.42	20.74	20.42	20.91	21.40	22.28	23.32	20.89	20.35
1919	20.15	20.72	20.89	20.56	21.63	22.95	24.13	24.41	24.68	24.57	25.68	24.20	22.70
1920	21.70	20.43	19.12	18.03	17.10	16.59	14.98	13.55	12.88	11.35	10.88	10.64	15.96
1921	9.85	9.66	9.86	9.82	9.67	10.46	10.55	11.04	11.80	12.39	12.28	10.98	10.58
1922	10.61	10.54	11.15	11.87	12.70	13.31	14.06	14.02	14.33	14.09	14.40	13.63	12.82
1923	12.45	12.01	12.78	13.37	13.59	14.39	13.99	14.08	13.98	14.09	14.12	13.70	13.54
1924	13.19	13.84	13.59	12.85	13.91	13.40	14.50	14.78	14.44	14.08	14.34	12.83	13.81
1925	13.02	13.00	12.91	13.41	13.74	14.14	13.90	14.24	13.50	13.53	13.17	13.33	13.52
1926	12.94	13.15	13.13	13.29	13.79	13.57	13.83	14.21	14.38	13.85	13.59	13.03	13.57
1927	11.73	11.47	11.34	11.52	11.75	12.02	12.09	11.84	12.46	12.56	12.90	12.42	11.96
1928	11.98	11.82	12.20	12.82	13.29	13.90	14.54	15.34	16.07	16.20	15.50	14.50	13.90
1929	13.12	13.17	13.50	13.84	14.00	14.41	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of alfalfa hay for each State; yearly price obtained by weighting monthly prices by average monthly marketings.

TABLE 317.—*Hay, clover: Estimated average price per ton received by producers, United States, 1914–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914	11.85	12.09	12.44	12.47	12.70	12.76	13.07	13.36	13.41	13.65	13.79	12.78	12.83
1915	11.65	10.87	10.82	10.60	10.59	10.95	11.24	11.41	11.70	11.87	12.52	12.46	11.29
1916	10.84	9.93	10.01	10.08	10.46	10.86	11.38	11.65	11.90	13.06	13.94	14.22	11.33
1917	12.95	12.76	13.79	15.01	17.14	18.67	19.82	21.11	21.37	19.68	18.30	16.54	17.21
1918	15.73	17.18	19.27	20.60	21.13	21.26	21.69	21.11	21.25	23.36	25.33	25.48	20.93
1919	22.02	21.58	21.74	21.17	21.61	22.60	23.78	24.94	26.13	26.93	28.31	27.80	23.69
1920	24.62	22.82	22.57	21.29	20.60	19.96	19.17	17.39	16.44	15.47	14.90	14.52	19.48
1921	13.89	14.17	14.37	13.99	13.83	14.17	13.90	14.10	14.06	14.51	14.90	14.33	14.15
1922	12.82	12.66	12.54	12.51	12.67	13.03	13.39	13.35	13.24	13.47	13.58	13.70	13.03
1923	13.52	13.51	14.12	14.73	14.94	15.82	15.51	15.93	16.31	16.08	15.92	15.95	15.14
1924	15.45	14.00	13.75	13.65	13.64	13.45	13.25	13.30	12.52	12.41	12.67	12.26	13.43
1925	13.03	13.67	14.06	14.09	14.74	15.28	14.79	14.82	14.79	14.88	15.13	15.07	14.52
1926	14.40	14.25	14.60	14.71	14.76	15.24	15.71	16.16	15.64	15.51	15.21	14.65	15.06
1927	13.11	12.16	11.78	11.91	11.86	11.91	12.24	11.96	12.02	12.23	12.51	12.63	12.15
1928	12.52	12.25	12.50	12.58	13.01	13.05	13.41	13.59	13.93	13.43	13.24	12.92	13.02
1929	11.60	11.61	11.82	11.77	11.82	11.97	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of clover hay for each State; yearly prices obtained by weighting monthly prices by average monthly marketings.

TABLE 318.—*Hay, timothy: Estimated average price per ton received by producers, United States, 1914–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914	13.06	13.03	13.54	13.66	13.69	13.69	14.07	14.28	14.28	14.53	14.74	14.33	13.87
1915	13.43	12.39	12.33	12.14	12.24	12.73	13.11	13.39	13.61	14.00	14.50	14.71	13.09
1916	12.97	11.74	11.57	11.54	12.03	12.29	12.61	12.91	13.20	14.26	15.31	15.76	12.83
1917	14.68	14.11	14.89	16.23	18.33	20.31	21.37	22.25	22.53	21.47	20.40	18.55	18.67
1918	17.61	18.98	20.85	22.60	22.93	22.94	23.48	22.69	22.68	24.74	27.27	27.50	22.66
1919	24.22	23.89	23.65	23.04	22.90	23.71	24.59	25.49	26.75	27.99	29.92	30.05	25.13
1920	26.59	24.35	24.15	22.74	22.09	21.22	19.88	18.30	17.04	16.09	15.44	15.16	20.64
1921	14.51	15.01	14.83	14.39	14.22	14.31	14.51	14.77	15.06	15.52	16.10	15.75	14.82
1922	14.33	13.61	13.44	13.70	13.93	13.91	14.41	14.46	14.59	14.64	14.96	14.95	14.18
1923	14.86	14.68	15.13	16.22	16.78	16.95	16.96	17.25	17.53	17.53	17.48	17.52	16.53
1924	16.74	15.24	14.47	14.54	14.00	14.37	14.29	14.24	13.31	13.39	13.38	13.05	14.30
1925	13.89	14.06	14.98	15.11	15.38	15.87	15.82	15.79	15.59	15.81	16.31	16.64	15.40
1926	16.01	15.52	15.32	15.49	15.62	15.81	14.58	15.82	15.39	15.05	15.14	14.97	15.42
1927	13.29	12.03	11.70	11.58	11.67	11.31	11.34	11.03	11.14	11.17	11.75	11.82	11.64
1928	11.68	11.79	11.77	11.86	12.18	12.35	12.45	12.99	13.01	12.86	12.64	12.57	12.31
1929	11.91	11.61	11.60	11.67	11.70	11.57	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of timothy hay for each State; yearly prices obtained by weighting monthly prices by average monthly marketings.

TABLE 319.—*Hay, prairie: Estimated average price per ton, received by producers, United States, 1914–1929*

Year beginning July	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1914	7.49	7.29	7.33	7.59	7.49	7.37	7.65	7.86	8.03	8.58	8.29	7.72	7.69
1915	7.37	6.83	6.64	6.44	6.75	6.95	7.38	7.34	7.39	7.56	7.71	7.97	7.13
1916	7.25	6.96	7.21	7.26	7.85	8.14	8.58	8.60	9.32	10.94	12.02	11.84	8.61
1917	10.11	10.82	11.40	12.29	13.32	14.91	15.39	15.74	15.47	14.47	12.75	12.78	13.31
1918	12.51	13.26	14.35	15.06	15.47	16.30	16.33	16.35	17.38	18.85	20.22	18.71	16.03
1919	16.10	16.10	15.90	15.88	16.91	17.19	17.54	17.36	16.52	16.66	18.06	17.59	16.78
1920	15.38	13.74	12.93	11.83	11.47	10.80	10.20	9.46	8.70	8.43	8.05	8.02	10.94
1921	7.67	7.50	7.52	6.78	7.49	7.47	7.39	7.67	7.94	8.02	8.24	8.40	7.62
1922	7.68	7.76	7.54	7.74	8.13	8.98	9.44	9.52	9.61	9.74	10.64	10.07	8.79
1923	9.17	8.97	8.58	9.19	9.07	9.26	8.84	8.87	8.66	8.78	8.74	8.54	8.92
1924	8.35	8.60	8.49	8.25	8.25	8.62	9.14	9.08	9.05	9.11	9.27	8.55	8.70
1925	8.93	8.55	9.24	9.41	9.39	9.78	9.73	9.53	9.48	9.08	9.54	9.59	9.36
1926	9.63	10.55	10.52	10.78	10.76	10.98	11.28	11.76	11.50	10.70	11.51	10.77	10.87
1927	9.15	8.65	7.98	7.67	7.47	7.55	7.41	6.98	6.79	6.96	7.32	7.59	7.64
1928	7.80	7.31	7.62	7.71	7.72	7.88	8.01	8.33	8.99	8.83	8.85	9.03	8.10
1929	8.54	8.24	8.39	8.21	8.44	8.31	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of prairie hay for each State; yearly prices obtained by weighting monthly prices by average monthly marketings.

TABLE 320.—*Hay: Average price per ton at leading markets, by kind and grade, 1920–1928*

Year beginning July	Alfalfa, Kansas City		Clover, Cincinnati			Prairie upland, Kansas City		Timothy, Chicago	
	No. 1	No. 2	No. 1	No. 1, light mixed	No. 1, mixed	No. 1	No. 2	No. 1	No. 2
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1920	23.90	17.60	23.90	25.50	24.30	15.50	13.20	------	------
1921	19.75	13.90	19.80	19.00	17.80	11.70	10.00	------	------
1922	22.10	16.80	16.40	17.40	16.40	14.40	12.90	22.30	18.50
1923	23.60	16.90	23.90	23.40	22.60	13.90	12.60	26.30	23.30
1924	20.10	15.00	17.90	18.00	17.20	11.20	9.80	23.90	19.50
1925	21.10	17.40	22.50	23.60	22.60	14.20	12.80	24.70	21.90
1926	19.00	16.60	22.90	21.20	21.70	14.50	12.70	21.80	19.70
1927	20.80	16.00	------	15.70	16.40	10.90	8.90	18.60	16.40
1928	24.80	22.70	24.10	19.20	20.90	12.10	10.50	22.20	20.20

Bureau of Agricultural Economics. Compiled from reports made direct to the bureau.

TABLE 321.—*Alfalfa meal, No. 1 medium: Average price per ton, bagged, in car lots, Kansas City, 1919–1929*

Year beginning July	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1919	------	------	------	------	------	------	40.70	40.00	38.10	40.40	46.75	42.75	------
1920	38.25	35.50	34.60	29.70	29.90	25.40	23.10	19.60	18.60	18.70	18.00	18.10	25.80
1921	19.00	18.75	17.75	16.90	16.50	16.70	16.75	17.50	19.75	19.40	20.90	21.90	18.50
1922	18.60	19.50	21.20	24.60	26.25	26.20	25.40	25.40	24.40	26.50	26.10	23.40	24.00
1923	21.50	22.40	25.50	25.70	26.90	25.20	26.25	23.90	23.20	20.90	21.20	21.75	23.70
1924	22.00	22.60	23.25	23.10	22.50	23.90	24.20	22.50	22.25	22.00	22.70	22.90	22.80
1925	23.00	24.00	24.25	24.40	24.10	24.40	24.80	24.00	23.10	23.90	25.40	23.90	24.10
1926	23.00	22.80	22.25	22.40	22.90	22.30	22.00	21.75	21.40	21.00	22.20	21.60	22.10
1927	21.75	22.40	23.40	23.10	22.75	23.30	24.40	26.25	29.40	33.50	34.25	31.70	26.40
1928	27.60	25.60	26.00	26.60	26.60	28.60	29.75	29.90	28.50	28.00	27.00	25.10	27.40
1929	23.50	25.00	27.30	27.50	26.80	27.40	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from reports made to the bureau.

TABLE 322.—*Pasture:*[1] *Condition, 1st of month, United States, 1909–1929*

Year	May	June	July	Aug.	Sept.	Oct.	Year	May	June	July	Aug.	Sept.	Oct.
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*		*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
1909	79.1	86.9	91.8	86.4	------	------	1920	79.3	90.2	91.4	87.7	88.1	86.9
1910	86.9	87.1	79.7	71.5	------	------	1921	90.0	89.4	84.4	78.3	82.1	84.8
1911	83.1	82.7	67.2	62.7	------	------	1922	85.9	94.6	88.5	86.7	78.7	72.7
1912	82.9	92.5	89.7	87.3	------	------	1923	79.4	86.1	87.2	79.4	80.2	85.0
1913	85.5	88.1	81.6	74.3	------	------	1924	82.4	83.2	87.2	82.0	76.6	78.6
1914	88.9	90.0	83.0	76.2	------	------	1925	82.2	75.7	73.0	69.5	67.4	72.9
1915	88.4	92.5	93.2	95.5	97.7	95.9	1926	74.6	77.0	77.0	69.9	78.2	83.7
1916	84.8	90.8	94.8	84.5	79.8	76.9	1927	87.0	88.3	92.8	86.9	84.2	80.1
1917	79.9	83.1	84.1	78.5	77.5	75.5	1928	71.3	78.6	84.4	85.6	83.3	77.7
1918	81.6	89.3	82.0	72.4	67.7	73.5	1929	86.9	87.2	87.5	79.7	67.1	70.2
1919	91.1	97.4	95.8	85.3	81.6	78.9							

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For range States, condition given as reported. Probably relates largely to farm pasture, i. e., range not included.

TABLE 323.—*Pasture:*[1] *Condition, 1st of month, by States, average 1919–1928, and 1929*

State and division	May: Average, 1919–1928	May: 1929	June: Average, 1919–1928	June: 1929	July: Average, 1919–1928	July: 1929	August: Average, 1919–1928	August: 1929	September: Average, 1919–1928	September: 1929	October: Average, 1919–1928	October: 1929
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
Maine	86	86	88	88	87	91	87	76	83	66	80	64
New Hampshire	86	88	90	93	88	94	90	71	86	69	84	67
Vermont	86	90	89	93	91	99	93	92	89	78	88	74
Massachusetts	84	88	90	90	87	81	87	57	88	46	86	57
Rhode Island	84	88	89	92	88	82	88	62	86	58	84	64
Connecticut	82	92	88	95	88	79	86	53	86	50	86	56
New York	81	87	86	89	86	87	84	75	83	60	83	56
New Jersey	81	90	85	90	79	82	81	50	88	46	83	67
Pennsylvania	80	89	86	90	84	86	83	71	85	56	83	58
North Atlantic	81.8	88.1	86.3	89.9	85.7	86.8	84.4	71.6	84.7	58.4	83.4	58.9
Ohio	79	90	85	92	85	92	83	89	84	80	82	80
Indiana	80	88	86	89	85	92	77	85	80	71	79	74
Illinois	83	88	85	88	84	92	76	87	79	77	80	69
Michigan	72	81	84	84	82	90	74	74	74	49	81	45
Wisconsin	78	91	85	87	86	94	78	87	75	68	80	67
Minnesota	78	86	83	78	85	77	79	67	74	55	77	64
Iowa	85	93	85	91	88	96	81	93	84	78	88	83
Missouri	84	91	86	90	88	94	81	84	82	70	83	70
North Dakota	76	78	81	72	86	71	81	50	74	37	74	45
South Dakota	79	86	81	81	83	77	79	70	76	54	75	66
Nebraska	84	91	88	90	89	92	82	83	79	65	79	77
Kansas	84	88	87	90	88	91	83	88	79	70	82	76
North Central	81.0	88.7	85.2	87.7	86.2	90.2	80.0	83.1	79.5	68.1	81.2	71.3
Delaware	81	91	84	91	74	78	77	55	83	42	78	54
Maryland	78	91	82	88	77	84	76	65	83	50	80	65
Virginia	80	93	84	93	81	95	82	90	85	77	79	71
West Virginia	81	91	85	92	88	87	89	79	90	74	87	69
North Carolina	83	89	84	90	85	92	84	91	83	88	77	87
South Carolina	81	86	78	87	79	84	80	82	76	71	70	76
Georgia	82	88	83	87	82	87	84	82	79	70	72	73
Florida	81	81	82	84	88	89	91	90	90	88	87	90
South Atlantic	80.9	90.0	83.5	90.1	82.9	89.4	83.6	83.4	84.4	74.0	78.9	73.5
Kentucky	83	90	87	91	88	91	83	83	84	69	80	80
Tennessee	83	91	87	93	86	91	79	87	82	73	77	80
Alabama	83	87	85	87	83	84	81	82	79	66	71	70
Mississippi	85	87	86	86	86	83	81	83	80	75	74	75
Arkansas	83	88	88	91	86	85	81	72	78	50	78	52
Louisiana	85	86	87	86	89	82	84	80	82	74	79	73
Oklahoma	84	86	88	89	88	88	80	78	74	57	76	65
Texas	84	88	88	89	88	86	80	77	74	59	78	65
South Central	84.0	88.0	87.4	89.3	87.5	86.8	80.6	79.3	77.0	62.6	77.0	68.7
Montana	81	80	87	80	86	86	81	62	78	53	76	62
Idaho	87	82	92	85	87	87	82	78	79	76	79	73
Wyoming	89	80	95	89	94	93	89	86	88	79	87	86
Colorado	86	84	90	88	90	75	85	73	86	83	82	86
New Mexico	75	80	84	88	81	83	78	78	83	87	80	89
Arizona	84	85	84	75	81	67	82	75	86	90	84	95
Utah	87	80	92	82	88	77	83	77	81	86	80	93
Nevada	88	73	93	75	90	78	87	77	84	71	84	71
Washington	87	70	90	79	85	85	74	75	70	65	75	58
Oregon	92	77	94	86	90	93	84	80	77	71	80	65
California	87	71	85	69	83	69	81	68	79	68	77	68
Far Western	85.2	77.4	88.3	79.9	86.3	79.5	82.2	72.5	80.7	72.0	79.5	74.1
United States	82.3	86.9	86.0	87.2	86.2	87.5	81.1	79.7	80.0	67.1	80.1	70.2

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] For range States, condition given as reported. Probably relates largely to farm pasture, i. e., range not included.

TABLE 324.—*Hops: Acreage, production, December 1 price, imports, exports, and consumption in the United States, 1915–1929*

Year beginning July	Acreage	Average yield per acre	Production	Price per pound received by producers Dec. 1	Imports [1]	Domestic exports [1]	Net exports [1]	Consumption by brewers [2]
	Acres	*Pounds*	*1,000 pounds*	*Cents*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1915	44, 653	1, 187	52, 986	11. 7	676	22, 410	21, 869	37, 452
1916	43, 900	1, 153	50, 595	12. 0	237	4, 875	4, 664	41, 949
1917	29, 900	983	29, 388	33. 3	121	3, 495	3, 411	33, 481
1918	25, 900	829	21, 481	19. 3	(3)	7, 467	7, 472	13, 925
1919	21, 000	1, 189	24, 970	77. 6	2, 696	30, 780	28, 187	6, 441
1920	28, 000	1, 224	34, 280	35. 7	4, 808	22, 206	18, 226	5, 989
1921	27, 000	1, 087	29, 340	24. 1	893	19, 522	19, 116	4, 453
1922	23, 400	1, 186	27, 744	8. 6	1, 295	13, 497	12, 401	4, 556
1923	18, 440	1, 071	19, 751	18. 8	761	20, 461	19, 832	3, 815
1924	20, 350	1, 360	27, 670	10. 3	439	16, 122	15, 737	[4] 3, 256
1925	20, 350	1, 404	28, 573	21. 8	581	14, 998	14, 592	[4] 3, 426
1926	20, 800	1, 516	31, 522	23. 1	470	13, 369	12, 936	[4] 3, 149
1927	24, 600	1, 246	30, 658	22. 9	753	11, 812	11, 087	[4] 3, 071
1928	26, 200	1, 257	32, 944	19. 3	649	8, 836	8, 198	
1929 [5]	24, 900	1, 334	33, 220	11. 4				

Bureau of Agricultural Economics. Compiled from reports of the Division of Crop and Livestock Estimates, Bureau of Foreign and Domestic Commerce, records of the Bureau of Internal Revenue, and annual reports of the Commissioner of Prohibition.

[1] Compiled from Commerce and Navigation of the United States, 1910–1917; Foreign Commerce and Navigation of the United States, 1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1926; January and June issues, 1927–1929 and official records of the Bureau of Foreign and Domestic Commerce.
[2] Figures for 1919 and subsequent years represent hops used to make cereal beverages.
[3] Less than 500 pounds.
[4] Not including 57,936 pounds in 1924, 71,508 pounds in 1925, 960 pounds in 1926, and 6,294 pounds in 1927, used in the manufacture of distilled spirits
[5] Preliminary.

TABLE 325.—*Hops: Acreage, yield per acre and production in specified countries, 1927–1929*

Country	Acreage			Yield per acre			Production		
	1927	1928	1929, preliminary	1927	1928	1929, preliminary	1927	1928	1929, preliminary
	Acres	*Acres*	*Acres*	*Pounds*	*Pounds*	*Pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
North America:									
Canada [1]	1, 037	1, 049	[2] 1, 200	1, 375	922		1, 426	967	
United States [3]	24, 600	26, 200	24, 900	1, 246	1, 257	1, 334	30, 658	32, 944	33, 220
Europe:									
England and Wales	23, 004	23, 805	23, 986	1, 244	1, 139	1, 677	28, 616	27, 115	40, 219
Belgium	3, 744	3, 652	4, 638	1, 529	1, 335	1, 338	5, 724	4, 874	6, 207
France	11, 883	11, 515	11, 548	940	790	1, 335	11, 168	9, 098	15, 417
Germany	38, 318	37, 740	37, 871	413	489	794	15, 827	18, 445	30, 074
Austria	773	744		298	339		230	252	
Czechoslovakia	31, 130	39, 615	43, 000	768	525	464	23, 922	20, 799	19, 941
Hungary	321	656		336	468		108	307	
Yugoslavia	21, 863	22, 000	16, 543	381	525	566	8, 324	11, 540	[2] 9, 370
Rumania		146			390			57	
Poland	5, 683	8, 678	[2] 8, 392	667	438	657	3, 792	3, 802	[2] 5, 512
Russia							[4] 6, 753		
Total all countries reporting for all years	161, 262	174, 254	172, 078				128, 031	128, 617	159, 960
Oceania:									
Australia	[2] 1, 557			1, 861			2, 898		
New Zealand	649			1, 169			759		
Total countries reporting acreage and production for all years	160, 225	173, 205	170, 878	799	743	936	128, 031	128, 617	159, 960
Estimated world total, excluding Russia [5]	164, 703	178, 000					133, 502	133, 898	

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture except as otherwise stated. Production figures are for the crop harvested in the calendar year in the Northern Hemisphere and the succeeding harvest in the Southern Hemisphere.

[1] British Columbia.
[2] Unofficial estimate.
[3] Principal producing States.
[4] Production in Ukraine, where the bulk of the crop is grown.
[5] Exclusive of acreage and production in minor producing countries for which no data are available.

TABLE 326.—*Hops: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	6,235	15,416	592	20,655	568	12,833	554	14,119	581	7,985
Czechoslovakia	0	0	1,787	12,389	1,195	16,222	1,139	17,904	1,638	14,451
France	5,436	335	4,015	9,114	3,931	6,159	5,407	5,682	4,345	3,612
Yugoslavia	0	0	298	6,964	169	6,945	273	9,030	198	16,929
Poland	0	0	308	1,661	330	1,850	593	3,843	367	4,705
New Zealand	61	352	2	340	18	393	4	530	1	408
PRINCIPAL IMPORTING COUNTRIES										
Germany	7,688	17,564	12,388	1,666	15,953	1,156	10,722	3,825	9,967	3,092
Irish Free State	0	0	6,758	0	6,575	0	5,174	0	5,852	0
United Kingdom	21,026	2,162	10,114	4,989	3,924	8,800	10,855	6,119	7,745	1,977
Belgium	6,915	4,814	4,621	3,989	4,626	3,140	4,489	1,853	6,479	1,433
Canada	1,396	176	3,524	85	2,165	357	1,962	709	2,397	488
Austria	[1] 938	[1] 18,333	3,058	[2] 127	2,977	130	2,924	62	3,141	201
Netherlands	2,938	1,405	961	207	931	135	1,556	24	1,246	50
Japan	253	0	908	0	798	0	1,011	0	1,002	0
Sweden	987	1	978	0	971	2	1,287	1	1,057	0
Argentina	618	0	1,142	0	1,000	0	1,042	0	-------	0
Switzerland	1,257	[3] 2	828	0	977	0	1,072	0	1,189	0
Denmark	1,027	[4] 1	674	1	812	1	811	0	898	-------
Italy	529	10	732	14	816	13	626	0	743	10
Union of South Africa	487	0	466	0	577	0	709	0	496	0
Norway	289	0	407	0	355	0	346	0	194	0
Russia [2]	[5] 1,258	[5] 2,348	542	0	87	0	2	2	-------	-------
Hungary	0	0	275	82	356	123	444	146	278	188
British India	246	0	171	0	209	0	148	0	129	0
Australia [2]	[5] 1,106	[5] 22	318	69	299	129	145	397	-------	-------
Total, 25 countries	60,692	62,941	55,867	62,352	50,619	58,388	53,295	64,246	49,943	55,529

Bureau of Agricultural Economics. Official sources except where otherwise noted. Lupulin and hopfenmehl (hop meal) are not included.

[1] Average for Austria-Hungary.
[2] International Yearbook of Agricultural Statistics.
[3] 1 year only.
[4] 3-year average.
[5] From original source.

TABLE 327.—*Peanuts: Acreage, yield per acre, production, and December 1 price, United States, 1916–1929*

Year	Total acreage, yield, and production			Nuts gathered			
	Total acreage [1]	Yield per acre	Total production [2]	Area	Yield per acre	Total quantity gathered	Farm price, Dec. 1 [3]
	1,000 acres	*Pounds*	*1,000 lbs.*	*1,000 acres*	*Pounds*	*1,000 lbs.*	*Cents*
1916	-------	-------	-------	1,043	881.1	919,028	4.49
1917	-------	-------	-------	1,842	777.7	1,432,581	6.88
1918	-------	-------	-------	1,865	664.9	1,240,102	6.47
1919	-------	-------	-------	1,132	691.9	783,273	9.33
1920	-------	-------	-------	1,181	712.5	841,474	5.26
1921	-------	-------	-------	1,214	683.1	829,307	3.99
1922	-------	-------	-------	1,005	630.0	633,114	4.68
1923	-------	-------	-------	896	722.9	647,762	6.78
1924	1,830	615.3	1,125,932	1,187	627.7	745,059	4.60
1925	1,563	666.4	1,041,514	958	729.1	698,475	3.64
1926	1,315	669.1	879,923	843	749.5	631,825	[4] 4.54
1927	1,786	735.0	1,312,643	1,142	757.0	864,549	[4] 3.98
1928	1,930	661.2	1,276,078	1,211	706.1	855,096	[4] 4.44
1929 [5]	2,024	672.1	1,360,277	1,328	700.8	930,700	[4] 3.62

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Including acres planted in corn reduced to equivalent solid acres as well as the acreage grown alone.
[2] Including peanuts grazed or otherwise utilized as well as those gathered.
[3] Farm prices are as of Nov. 15, 1916–1923; Dec. 1, 1924–1929.
[4] Average price weighted on total production.
[5] Preliminary.

TABLE 328.—*Peanuts: Acreage, yield per acre, production, and December 1 price, by States, 1926–1929*

State	Nuts gathered															
	Acreage				Yield per acre				Production				Farm price, Dec. 1			
	1926	1927	1928	1929 [1]	1926	1927	1928	1929	1926	1927	1928	1929 [1]	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Va.	138	152	152	160	990	810	928	913	136, 620	123, 120	141, 056	146, 080	4. 3	4. 5	4. 7	3. 9
N. C.	180	211	205	220	1, 030	954	1, 050	1, 020	185, 400	201, 294	215, 250	224, 400	4. 2	4. 5	4. 9	4. 0
S. C.	8	11	10	10	675	775	690	735	5, 400	8, 525	6, 900	7, 350	5. 2	3. 7	4. 2	3. 4
Ga.	211	304	350	343	525	725	540	650	110, 775	220, 400	189, 000	222, 950	4. 9	3. 9	4. 4	3. 4
Fla.	39	44	44	46	680	640	575	600	26, 520	28, 160	25, 300	27, 600	4. 5	3. 7	4. 2	3. 5
Tenn.	20	20	18	20	900	850	800	820	18, 000	17, 000	14, 400	16, 400	3. 5	4. 2	4. 7	3. 3
Ala.	140	230	225	260	570	680	560	550	79, 800	156, 400	126, 000	143, 000	4. 5	3. 4	3. 9	3. 0
Miss.	8	9	10	10	650	725	600	640	5, 200	6, 525	6, 000	6, 400	5. 7	6. 0	6. 5	6. 5
Ark.	10	11	12	18	675	800	720	575	6, 750	8, 800	8, 640	10, 350	6. 0	6. 0	6. 4	5. 0
La.	10	13	12	16	552	625	450	595	5, 520	8, 125	5, 400	9, 520	6. 2	6. 1	6. 6	6. 5
Okla.	8	20	47	80	800	800	750	570	6, 400	16, 000	35, 250	45, 600	4. 5	3. 5	4. 5	3. 9
Tex.	71	117	126	145	640	600	650	490	45, 440	70, 200	81, 900	71, 050	4. 5	3. 5	3. 8	3. 7
U. S.	843	1, 142	1, 211	1, 328	749. 5	757. 0	706. 1	700. 8	631, 825	864, 549	855, 096	930, 700	[2] 4. 54	[2] 3. 98	[2] 4. 44	[2] 3. 62

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.
[2] Average price weighted on total production, which includes peanuts grazed or otherwise utilized as well as those gathered.

TABLE 329.—*Peanuts: Estimated average price per pound, in the shell, received by producers, United States, 1910–1929*

Year beginning November	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
1910	4. 7	4. 5	4. 4	5. 0	4. 8	4. 9	4. 8	5. 2	5. 0	5. 3	5. 1	4. 6	4. 6
1911	4. 4	4. 4	4. 3	4. 7	5. 0	4. 9	4. 9	5. 2	4. 9	5. 0	4. 8	4. 7	4. 4
1912	4. 7	4. 6	4. 6	4. 5	4. 7	4. 8	4. 7	5. 0	5. 1	4. 9	4. 9	4. 8	4. 6
1913	4. 4	4. 8	4. 7	4. 7	4. 7	4. 9	5. 1	5. 1	5. 2	4. 9	5. 0	4. 5	4. 6
1914	4. 4	4. 3	4. 5	4. 4	4. 2	4. 5	4. 8	4. 8	4. 7	4. 5	4. 4	4. 3	4. 4
1915	4. 2	4. 2	4. 3	4. 4	4. 4	4. 6	4. 6	4. 7	4. 6	4. 6	4. 4	4. 4	4. 3
1916	4. 4	4. 7	4. 9	5. 3	5. 5	6. 2	7. 2	7. 7	7. 6	7. 2	6. 6	6. 1	4. 8
1917	7. 1	7. 1	7. 0	7. 2	7. 4	8. 3	8. 2	7. 9	7. 8	7. 9	8. 3	6. 9	7. 1
1918	6. 6	6. 1	6. 0	6. 9	7. 0	6. 9	7. 2	7. 7	8. 2	8. 1	8. 3	8. 1	6. 5
1919	9. 1	9. 1	9. 9	10. 5	11. 2	10. 9	11. 2	11. 2	11. 0	8. 5	8. 0	5. 8	9. 2
1920	5. 3	4. 7	4. 4	4. 1	4. 0	3. 5	3. 4	3. 8	3. 8	3. 9	4. 0	4. 0	4. 7
1921	3. 7	3. 5	3. 6	4. 0	4. 3	3. 9	3. 9	4. 2	4. 4	4. 4	4. 7	3. 6	3. 7
1922	5. 2	5. 0	5. 9	6. 5	6. 7	7. 1	7. 1	7. 3	6. 9	6. 7	6. 7	7. 0	5. 5
1923	6. 8	6. 2	6. 4	6. 7	6. 8	6. 7	6. 4	6. 5	6. 4	6. 6	6. 4	6. 4	6. 5
1924	6. 3	5. 6	5. 4	5. 5	5. 9	5. 7	6. 2	6. 2	5. 4	5. 2	5. 7	4. 7	5. 7
1925	5. 1	4. 4	4. 5	4. 7	4. 6	5. 1	5. 0	4. 7	5. 3	5. 3	5. 1	4. 9	4. 7
1926	4. 6	4. 7	4. 9	5. 4	5. 6	5. 7	5. 9	6. 6	6. 4	6. 4	6. 0	4. 9	4. 8
1927	4. 6	5. 2	5. 4	5. 4	5. 4	5. 5	5. 7	5. 6	5. 5	5. 5	5. 0	4. 6	5. 0
1928	4. 8	5. 1	5. 0	5. 1	5. 1	5. 2	5. 0	5. 1	4. 9	4. 7	4. 6	4. 4	4. 9
1929	4. 0	3. 8											

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of peanuts for each State; yearly price obtained by weighting monthly prices by estimated monthly marketings.

TABLE 330.—*Peanuts: Monthly average prices of cleaned and shelled peanuts, for prompt shipment f. o. b. important shipping points, 1928–29*

VIRGINIA-NORTH CAROLINA SECTION: VIRGINIA, NORTH CAROLINA, AND TENNESSEE [1]

	1928		1929									
	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Cleaned:	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
Virginias, Jumbos	9¾	9⅝	9½	9½	9⅛	8¾	8½	8½	8⅜	8	7⅞	7½
Fancys	6⅞	7⅛	7¼	7⅜	7¼	7	6⅞	6⅞	6¾	6⅝	6⅝	6⅝
Extras	6	6⅛	6⅜	6⅜	6⅛	6⅛	6⅛	6	5⅞	5¾	5¾	5⅜
Shelled, Virginias:												
Extra large	10⅝	10¾	11¼	11⅝	11¼	10¾	10⅝	10⅝	10⅝	10⅜	10¾	10⅝
Virginias, No. 1	7⅛	8⅜	8⅞	9	8½	8¼	8⅛	8⅛	7⅞	7⅝	7¾	7⅜
Virginias, No. 2	5¾	5¾	5⅞	6	5½	5¼	5⅛	5⅛	5⅛	5⅛	5⅜	5¼

SOUTHEAST SECTION: SOUTH CAROLINA, GEORGIA, ALABAMA, AND FLORIDA [2]

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Shelled:												
Spanish, No. 1	7¼	7⅝	7⅝	7⅜	6⅞	6⅜	6½	6½	6¼	6⅛	6½	6⅛
Spanish, No. 2	6¼	6½	6⅜	6⅛	6	5⅜	5¼	5⅛	5⅛	5⅛	5¼	5¼
Runners, No. 1	6¾	7¼	7⅛	7	6¾	6⅛	6	5⅞	5½	5½	5⅝	5⅜
Runners, No. 2	6	6⅛	6	5⅞	5⅝	5⅛	4⅞	4⅞	4¾	4⅝	4⅞	4⅝

SOUTHWEST SECTION: TEXAS, OKLAHOMA, ARKANSAS [3]

	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.
Shelled:												
Spanish, No. 1	7½	7⅞	7¾	7⅞	7⅜	7⅛	7	7¼	7	6⅝	6⅝	6⅝
Spanish, No. 2	6½	6⅞	6⅝	6⅝	6¼	6⅛	6	6¼	6	5¾	5⅞	5⅝

Bureau of Agricultural Economics. Based on returns from cleaners, shellers, and brokers. Crop year extends from November to next October in the Virginia-North Carolina section; farther south it begins earlier. See 1927 Yearbook, p. 948, for data for earlier years.

[1] Important shipping points: Suffolk, Franklin, Petersburg, and Norfolk, Va., Edenton and Enfield N. C.

[2] Important shipping points: Albany, Cordele, Donalsonville, Camella, and Fort Gaines, Ga., Dothan, Enterprise, Troy, Montgomery, and Samson, Ala.

[3] Important shipping points: Denison, Fort Worth, and De Leon, Tex.; Hugo, Okla.

TABLE 331.—*Peanut oil, crude and virgin: Peanuts used in production and quantity of oil produced in United States, 1919–1929*

Year beginning Oct. 1	Peanuts crushed [1]					Oil produced				
	October-December	January-March	April-June	July-September	Total	October-December	January-March	April-June	July-September	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1919	4, 364	5, 867	9, 214	15, 770	35, 215	1, 395	1, 207	2, 311	3, 498	8, 411
1920	27, 414	27, 962	32, 923	23, 480	111, 779	6, 069	7, 287	8, 913	5, 958	28, 227
1921	40, 338	44, 152	25, 964	4, 703	115, 157	11, 075	11, 381	6, 771	1, 236	30, 463
1922	13, 169	9, 081	8, 436	941	31, 627	3, 256	1, 700	1, 998	255	7, 209
1923	6, 164	4, 676	5, 471	1, 928	18, 239	1, 406	1, 122	1, 328	438	4, 294
1924	17, 668	24, 678	16, 893	9, 096	68, 335	3, 804	5, 265	4, 091	1, 974	15, 134
1925	17, 134	17, 880	10, 668	4, 389	50, 071	3, 827	4, 001	3, 093	1, 006	11, 927
1926	10, 576	11, 143	6, 321	6, 966	35, 006	2, 544	2, 446	1, 400	1, 600	7, 990
1927	21, 810	24, 168	8, 177	6, 661	60, 816	5, 144	5, 324	1, 920	1, 626	14, 014
1928, preliminary	14, 740	19, 594	10, 392	10, 192	54, 918	3, 569	4, 463	2, 331	2, 309	12, 672

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census "Animal and vegetable fats and oils."

[1] Quantities reported in terms of hulled have been converted to "in the hull" basis by multiplying by 1.5.

TABLE 332.—*Peanuts: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31—									
	Average, 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Principal exporting countries:										
Senegal	[1] 168	425, 937	[1] 47	985, 469	[1] 114	1, 967, 024	[1] 19	[1] 894, 488		
British India	0	503, 448	0	1, 036, 670	0	994, 900	0	1, 063, 736	0	1, 676, 871
China	32, 882	138, 472	22, 800	530, 227	6, 577	534, 488	17, 510	430, 002		
Nigeria	0	17, 163	[1] 0	[1] 284, 983	[1] 0	[1] 284, 027	[1] 0	[1] 203, 329		
Gambia	0	131, 912	[1] 0	104, 346	[1] 0	[1] 136, 860	[1] 0	[1] 155, 096		
French possessions in India	0	306, 701	0	228, 212	0	224, 700				
Dutch East Indies	612	60, 282	518	43, 848	664	40, 976	654	56, 877	[2] 0	[2] 98, 543
Mozambique	[3] 1, 098	[3] 15, 907	5	24, 525	20	47, 472	8	73, 240		
Tanganyika	0	[1] 9, 275	0	20, 283	0	35, 542	0	31, 689		
Anglo-Egyptian Sudan	0	1, 961	[1] 1	26, 021	0	22, 122	0	3, 665	0	4, 066
Spain	0	9, 205	0	4, 574	0	3, 665				
Guinea (French)	1	4, 863	[1] 11	8, 903	[1] 0	7, 840	[1] 0	[1] 10, 916		
Brazil	0	274	0	195	0	18	0	1, 687	0	
Principal importing countries:										
France	1, 239, 659	47, 107	1, 503, 887	16, 082	1, 516, 515	14, 668	1, 454, 257	11, 388	1, 727, 894	10, 469
Germany	174, 970	[4] 98	713, 245	0	977, 777	0	930, 555	0	1, 883, 601	0
United Kingdom	0	0	335, 004	0	252, 187	0	132, 268	0	268, 327	0
Netherlands	122, 862	32, 863	229, 544	2, 005	235, 275	3, 278	186, 034	4, 364	165, 465	3, 695
United States	20, 988	6, 804	120, 158	3, 489	67, 874	4, 232	62, 697	4, 827	97, 533	5, 419
Italy	1, 194	804	97, 271	43	194, 522	283	287, 131	40	383, 595	59
Japan	0	10, 675	23, 434	2, 976	26, 036	364	24, 384	288	25, 825	652
Denmark	5, 236	0	27, 853	0	32, 346	0	27, 558	0	50, 310	0
Canada	7, 302	0	23, 793	0	28, 946	0	29, 808	0	31, 408	0
British Malaya	[1] 19, 488	[1] [5] 10, 839	23, 737	6, 259	19, 536	3, 927	25, 868	6, 492	54, 197	35, 204
Belgium	[3] 68, 422	[3] 43, 393	32, 838	410	88, 824	119	56, 539	241	59, 204	206
Egypt	4, 664	1, 637	13, 863	3, 925	9, 858	3, 660	3, 627	2, 029	2, 783	2, 113
Algeria	7, 022	218	8, 066	387	7, 387	331	[1] 9, 491	414		252
Sweden	[3] [6] 20	0	10, 065	0	11, 934	1	20, 435	0	23, 582	0
Poland	0	0	5, 439	3	369	0	1, 029	0	1, 089	0
Tunis	[3] 1, 459	0	3, 836	0	4, 577	0	4, 765	0		
Argentina	8, 667	0	4, 967	326	5, 343	41	6	33		
Philippine Islands	2, 264	0	2, 808	0	2, 429	0	3, 238	0	3, 177	0
Union of South Africa	3, 164	7	2, 666	154	3, 631	78	4, 033	277	6, 343	948
Total 32 countries	1, 722, 142	1, 779, 845	3, 205, 856	3, 334, 255	3, 498, 741	3, 430, 556	3, 281, 914	2, 955, 118	4, 784, 333	1, 838, 557

Bureau of Agricultural Economics. Official sources except where otherwise noted.

Includes shelled and unshelled, assuming the peanuts to be unshelled unless otherwise stated. When shelled nuts were reported they have been reduced to terms of unshelled at the ratio of 3 pounds unshelled to 2 pounds shelled.

[1] International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] 2-year average.
[4] 1 year only.
[5] 3-year average.
[6] International Institute of Agriculture, "Oleaginous Products and Vegetable Oils."

TABLE 333.—*Peanut oil: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31—									
	Average, 1909–1913 [1]		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Principal exporting countries:										
China	0	[2] 35,593	0	78,408	0	109,697	0	78,889	--------	--------
France	142	50,967	3,510	53,744	9,937	67,300	12,728	62,483	14,433	83,540
Germany	1,602	--------	23,016	20,551	4,109	24,217	5,861	52,507	3,207	83,763
Dutch East Indies	[3] 2,090	[3] 45	1,315	1,648	1,581	831	1,756	1,843	[4] 67	[4] 9,974
Principal importing countries:										
Netherlands	2,743	18,569	40,209	26,336	59,916	26,892	61,789	34,735	71,595	34,865
United Kingdom	--------	--------	25,148	25,431	29,678	22,100	46,411	9,354	--------	--------
Algeria	--------	--------	23,542	460	21,802	402	23,477	251	34,884	--------
Canada	--------	0	16,134	0	38,794	0	4,811	0	14,186	0
United States	[5] 7,295	0	3,027	0	8,281	0	2,847	0	4,749	0
Norway	--------	0	8,433	0	8,104	0	7,124	0	7,505	0
Italy	8,867	[3] 4	9,074	105	14,908	106	16,589	171	18,053	82
Sweden	2,459	--------	6,755	667	8,178	1,141	4,701	4,299	6,729	2,819
Belgium	2,233	2,065	9,184	5,030	6,816	4,879	6,526	5,608	10,048	3,660
Philippine Islands	[2] 976	0	3,286	0	4,030	0	5,483	0	3,892	0
Morocco	--------	0	1,894	0	1,615	0	1,163	0	--------	--------
Denmark	2,941	[2] 156	1,889	1,743	1,086	1,829	1,399	2,743	840	--------
Czechoslovakia	0	0	1,512	0	1,433	55	3,510	81	3,904	280
Total, 17 countries	31,348	107,399	177,928	214,123	220,268	259,449	206,175	252,964	194,092	218,983

Bureau of Agricultural Economics. Official sources except where otherwise noted. Conversions made on the basis of 7.5 pounds to the gallon.

[1] International Institute of Agriculture, "Oleaginous Products and Vegetable Oils."
[2] 4-year average.
[3] 2-year average.
[4] Java and Madura only.
[5] 3-year average.

TABLE 334.—*Peanut oil, refined: Average price per pound, in barrels, at New York, 1916–1929*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1916	12.19	12.60	13.33	13.49	13.50	14.38	14.80	17.58	17.83	17.87	17.44	18.05	15.26
1917	18.61	20.12	21.67	22.67	22.49	22.98	22.33	22.41	21.70	21.15	21.47	21.78	21.62
1918	21.44	22.75	22.75	21.06	20.36	20.25	19.90	22.38	24.58	26.91	29.31	30.05	23.48
1919	26.25	25.25	26.68	26.69	27.50	26.43	27.12	25.00	23.10	20.88	19.00	17.19	24.26
1920	16.88	16.20	14.62	12.75	12.52	12.34	11.00	10.70	10.50	10.25	10.00	10.12	12.32
1921	10.62	11.75	11.59	11.22	11.25	11.38	12.25	13.15	13.00	13.00	12.48	12.62	12.03
1922	12.40	12.25	13.03	14.25	16.88	17.38	17.85	17.75	16.56	16.00	16.00	16.00	15.53
1923	16.00	16.00	15.59	14.80	14.75	14.75	14.75	14.75	14.88	15.25	15.25	15.56	15.19
1924	16.45	16.25	16.25	16.25	16.75	16.75	16.75	16.75	15.20	15.00	15.00	15.00	16.03
1925	15.00	15.00	15.00	15.00	15.00	15.50	16.00	16.00	16.00	16.00	16.00	16.00	15.54
1926	16.00	16.00	15.50	14.62	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.84
1927	14.50	14.50	14.30	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.50	13.73
1928	13.50	13.50	12.25	11.00	13.50	13.50	13.50	13.44	13.25	13.25	13.25	13.25	13.10
1929	13.25	13.25	13.25	13.25	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter, average of weekly range.

TABLE 335.—*Clover seed: Receipts, Chicago, 1920–1928*

Year beginning September	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920	1, 207	969	747	1, 004	2, 288	2, 165	4, 062	1, 570	418	164	84	365	15, 043
1921	739	1, 235	2, 040	1, 833	1, 628	2, 674	2, 448	1, 009	279	169	77	997	15, 128
1922	1, 358	1, 293	1, 479	1, 214	1, 044	629	1, 825	845	350	109	8	272	10, 426
1923	641	1, 681	1, 176	1, 039	630	1, 641	2, 054	1, 352	259	41	1	40	10, 555
1924	346	888	2, 195	1, 801	1, 500	1, 507	1, 574	765	9	27	68	328	11, 008
1925	393	946	2, 125	2, 603	1, 984	2, 079	2, 888	849	487	28	107	366	14, 855
1926	1, 107	3, 596	2, 133	1, 350	1, 695	1, 857	1, 671	546	55	------	------	64	14, 074
1927	575	2, 285	4, 689	1, 544	1, 557	1, 522	1, 313	848	268	40	165	168	14, 974
1928	958	3, 125	2, 751	1, 746	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade.

TABLE 336.—*Clover, alfalfa, and timothy seed: Production and December 1 price, United States, 1916–1929*

Year	Production				Price per bushel received by producers Dec. 1			
	Clover seed (red and alsike)	Sweet-clover seed	Alfalfa seed	Timothy seed	Clover seed (red and alsike) [1]	Sweet-clover seed	Alfalfa seed	Timothy seed
	Bushels	*Bushels*	*Bushels*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1916	[2] 1, 706, 000	----------	----------	----------	9. 18	-------	-------	-------
1917	[2] 1, 488, 000	----------	----------	----------	12. 84	-------	-------	-------
1918	[2] 1, 197, 000	----------	----------	----------	19. 80	-------	-------	-------
1919	[2] 1, 545, 000	----------	----------	----------	26. 52	-------	-------	-------
1920	[2] 2, 023, 000	----------	----------	----------	11. 60	-------	-------	-------
1921	[2] 1, 422, 000	----------	----------	----------	10. 05	-------	-------	-------
1922	[2] 1, 815, 000	----------	----------	----------	10. 03	-------	-------	-------
1923	[2] 1, 028, 000	----------	----------	----------	12. 05	-------	-------	-------
1924	927, 000	767, 800	1, 002, 100	2, 730, 800	14. 51	6. 81	10. 69	3. 16
1925	1, 062, 000	1, 058, 900	1, 107, 500	1, 950, 800	14. 90	4. 87	10. 48	3. 43
1926	728, 000	1, 140, 100	958, 300	2, 529, 100	17. 71	6. 99	9. 80	2. 62
1927	1, 727, 000	1, 223, 800	851, 400	3, 016, 000	15. 22	4. 67	9. 28	1. 82
1928	961, 000	909, 400	532, 400	1, 229, 400	16. 22	3. 75	12. 24	2. 20
1929 [3]	2, 157, 000	961, 800	717, 800	1, 407, 200	10. 16	3. 74	10. 69	2. 23

Bureau of Agricultural Económics. Estimates of the crop-reporting board.

[1] From 1916 to 1924, Nov. 15 price; 1925–1929, Dec. 1 price.
[2] Includes "sweet clover."
[3] Preliminary.

TABLE 337.—*Clover seed (red and alsike): Acreage, yield per acre, production, and December 1 price, by States, 1927–1929*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1927	1928	1929 [1]	1927	1928	1929	1927	1928	1929 [1]	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*1,000 bush.*	*1,000 bush.*	*1,000 bush.*	*Dolls.*	*Dolls.*	*Dolls.*
New York	1	1	3	1. 8	1. 8	2. 3	2	2	7	19. 00	19. 70	14. 00
Pennsylvania	14	16	14	1. 6	1. 6	2. 0	22	26	28	17. 75	17. 75	15. 25
Ohio	268	161	322	1. 2	1. 2	1. 6	322	193	515	16. 00	16. 90	10. 20
Indiana	210	80	300	1. 2	1. 2	1. 3	252	96	390	15. 00	16. 70	9. 80
Illinois	187	75	180	1. 1	1. 1	1. 3	206	82	234	15. 00	17. 00	10. 25
Michigan	97	63	151	1. 6	1. 6	1. 7	155	101	257	14. 70	16. 10	9. 50
Wisconsin	138	36	85	1. 9	1. 4	1. 6	262	50	136	15. 50	16. 50	9. 90
Minnesota	80	53	64	2. 0	2. 0	1. 9	160	106	122	15. 50	16. 00	10. 50
Iowa	123	38	114	. 84	1. 3	1. 35	103	49	154	16. 10	18. 00	11. 00
Missouri	33	23	58	1. 7	1. 5	1. 5	56	34	87	13. 50	14. 80	9. 60
North Dakota	3	3	2	2. 0	2. 0	3. 0	6	6	6	13. 50	15. 00	9. 60
Nebraska	12	14	18	1. 7	1. 5	1. 7	20	21	31	15. 15	15. 60	11. 00
Kansas	12	6	9	1. 6	1. 5	1. 6	19	9	14	13. 10	13. 60	9. 70
Tennessee	3	3	10	2. 0	1. 9	2. 1	6	6	21	18. 00	17. 10	13. 75
Idaho	18	21	19	4. 7	4. 7	4. 2	84	99	80	13. 50	14. 60	9. 20
Colorado	------	1	2	------	5. 0	6. 0	------	5	12	------	15. 60	11. 55
Oregon	15	23	18	3. 5	3. 3	3. 5	52	76	63	14. 25	14. 90	9. 95
United States	1, 214	617	1, 369	1. 42	1. 56	1. 58	1, 727	961	2, 157	15. 22	16. 22	10. 16

Bureau of Agricultural Economics. Estimates of the crop reporting board.

Preliminary.

TABLE 338.—*Sweetclover seed: Acreage, yield per acre, production, and December 1 price, by States, 1927–1929*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1927	1928	1929[1]	1927	1928	1929	1927	1928	1929[1]	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Bushels*	*Dollars*	*Dollars*	*Dollars*
Ohio	10	6	7	3.8	3.5	3.6	38,000	21,000	25,200	6.20	5.80	4.80
Indiana	6	3	2	2.0	3.0	3.0	12,000	9,000	6,000	6.50	5.80	5.30
Illinois	20	13	17	3.7	4.0	4.0	74,000	52,000	68,000	7.00	5.30	5.10
Minnesota	50	30	24	4.0	4.1	5.0	200,000	123,000	120,000	3.50	3.40	3.30
Iowa	26	14	28	4.3	4.4	3.5	111,800	61,600	98,000	5.70	5.30	4.95
Missouri	5	6	7	3.5	3.0	3.7	17,500	18,000	25,900	6.00	5.40	4.50
North Dakota	55	50	50	4.2	3.7	4.2	231,000	185,000	210,000	4.25	3.50	3.55
South Dakota	45	54	49	4.2	4.3	4.3	189,000	232,200	210,700	4.20	3.00	3.30
Nebraska	33	22	24	3.9	3.7	4.3	128,700	81,400	103,200	5.00	3.90	3.10
Kansas	34	17	17	4.0	4.1	3.9	136,800	69,700	66,300	4.35	3.30	3.40
Montana	6	7	3	5.0	4.5	4.5	30,000	31,500	13,500	6.00	4.30	4.30
Colorado	10	5	3	5.5	5.0	5.0	55,000	25,000	15,000	4.50	3.70	3.55
United States	300	227	231	4.08	4.01	4.16	1,223,800	909,400	961,800	4.67	3.75	3.74

Bureau of Agricultural Economics. Estimates of the crop reporting board.

[1] Preliminary.

TABLE 339.—*Lespedeza (Japan clover) seed: Acreage, yield per acre, production, and December 1 price, by States, 1927–1929*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1927	1928	1929[1]	1927	1928	1929	1927	1928	1929[1]	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*Bushels*	*Bushels*	*Bushels*	*Dolls.*	*Dolls.*	*Dolls.*
Tennessee	10	10	15	4.0	4.0	4.0	40,000	40,000	60,000	2.50	2.50	2.75
Mississippi	31	24	22	6.2	4.7	6.0	192,500	112,800	132,000	2.81	2.79	3.35
Louisiana	5	6	5	5.2	5.2	3.0	28,100	31,200	15,000	2.45	3.21	3.60
United States	46	40	42	5.62	4.60	4.93	260,600	184,000	207,000	2.72	2.80	3.19

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 340.—*Timothy seed: Acreage, yield per acre, production, and December 1 price, by States, 1927–1929*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1927	1928	1929[1]	1927	1928	1929	1927	1928	1929[1]	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*Bushels*	*Bushels*	*Bushels*	*Dolls.*	*Dolls.*	*Dolls.*
New York	2	3	8	4.8	5.0	3.3	9,600	15,000	9,900	4.00	2.80	3.00
Pennsylvania	10	8	7	4.8	5.5	4.8	48,000	44,000	33,600	2.85	2.90	3.20
Ohio	90	40	50	4.4	4.3	4.2	396,000	172,000	210,000	2.10	2.20	2.25
Indiana	25	10	8	4.0	3.8	4.0	100,000	38,000	32,000	2.15	2.20	2.25
Illinois	130	65	78	4.4	3.5	4.0	572,000	227,500	312,000	1.85	2.20	2.20
Wisconsin	12	4	4	4.4	4.6	4.0	53,000	18,400	16,000	2.25	2.40	2.45
Minnesota	40	12	12	4.2	3.7	4.2	168,000	44,400	50,400	1.70	2.15	2.20
Iowa	256	104	125	4.2	3.6	4.0	1,075,200	374,400	500,000	1.65	2.15	2.20
Missouri	135	71	64	3.8	3.5	3.0	513,000	248,500	192,000	1.75	2.15	2.20
North Dakota	5	2	2	2.8	3.5	3.0	14,000	7,000	6,000	1.85	2.15	2.20
South Dakota	15	11	11	4.0	3.0	3.5	60,000	33,000	38,500	1.75	1.90	1.90
Kansas	2	2	2	3.6	3.6	3.4	7,200	7,200	6,800	1.90	1.90	2.00
United States	722	332	366	4.18	3.70	3.84	3,016,000	1,229,400	1,407,200	1.82	2.20	2.23

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Preliminary.

TABLE 341.—*Alfalfa seed: Acreage, yield per acre, production, and December 1 price, by States, 1927–1929*

State	Acreage			Average yield per acre			Production			Price per bushel received by producers Dec. 1		
	1927	1928	1929 [1]	1927	1928	1929	1927	1928	1929 [1]	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*Bush.*	*Bush.*	*Bush.*	*Bushels*	*Bushels*	*Bushels*	*Dolls.*	*Dolls.*	*Dolls.*
Minnesota	4	4	4	1.7	1.8	2.0	6,500	6,800	8,400	16.35	19.40	13.95
Missouri	3	3	3	3.5	3.0	2.0	10,500	9,000	6,000	13.95	15.50	12.00
North Dakota	4	4	15	1.8	1.9	2.0	7,200	7,600	30,000	17.10	19.00	16.80
South Dakota	18	22	28	1.6	2.0	2.1	28,800	44,000	58,800	13.00	13.45	12.95
Nebraska	19	9	14	2.2	2.2	3.3	41,800	19,800	46,200	11.50	12.35	11.75
Kansas	8	8	20	2.2	2.4	2.5	18,000	19,000	50,000	9.15	10.85	11.00
Oklahoma	12	10	11	3.0	2.6	3.0	36,000	26,000	33,000	8.45	9.30	10.00
Texas	7	3	3	4.0	1.5	2.9	28,800	4,000	7,500	8.25	9.00	9.80
Montana	11	20	30	1.8	2.4	2.4	19,800	48,000	72,000	13.00	13.90	11.50
Idaho	30	15	23	6.0	3.4	4.0	180,000	51,000	92,000	9.25	13.30	9.20
Wyoming	3	3	3	3.0	3.0	2.3	9,000	9,000	6,900	12.25	13.10	10.35
Colorado	3	2	5	3.5	3.0	4.0	10,200	6,000	20,000	10.75	11.80	10.10
New Mexico	6	6	6	4.5	3.0	3.5	29,200	16,500	21,000	8.20	10.15	10.00
Arizona	22	22	22	5.0	4.5	4.5	110,000	99,000	100,000	8.20	11.50	10.10
Utah	72	52	55	3.68	2.1	1.9	265,000	110,000	107,000	8.25	11.50	8.70
Oregon	1	3	3	4.0	3.5	3.8	4,000	10,500	11,400	11.75	12.75	12.00
California	13	14	14	3.5	3.3	3.5	46,600	46,200	47,600	9.60	11.70	10.20
United States	237	199	258	3.59	2.68	2.78	851,400	532,400	717,800	9.28	12.24	10.69

Bureau of Agricultural Economics. Estimates of the crop reporting board.

[1] Preliminary.

TABLE 342.—*Timothy seed: Receipts, Chicago, 1920–1928*

Year beginning August	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1920	2,347	8,075	5,676	4,009	2,951	1,706	2,076	4,056	2,601	2,368	1,088	579	37,532
1921	10,849	6,239	4,586	3,198	2,317	2,404	2,899	2,828	780	1,263	472	119	37,954
1922	8,967	9,593	4,577	2,048	1,050	570	1,352	1,697	1,243	398	355	124	31,974
1923	5,386	13,397	4,419	1,606	1,329	662	1,298	1,815	1,162	65	315	507	31,961
1924	3,698	12,714	4,845	3,736	1,552	2,138	2,038	2,566	1,809	1,240	664	687	37,687
1925	5,933	7,599	5,009	2,047	1,651	2,499	1,801	2,316	1,734	1,015	667	672	32,943
1926	5,907	7,981	3,368	2,113	1,158	1,588	1,780	2,601	1,481	980	779	516	30,252
1927	6,548	7,387	3,741	3,812	961	1,170	1,669	1,826	1,625	1,613	1,039	896	32,287
1928	1,652	5,664	3,164	956	921								

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade.

TABLE 343.—*Alfalfa seed: Estimated average price per bushel, received by producers, United States, 1920–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average [1]
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	16.03	14.89	13.35	12.25	10.24	9.95	9.01	9.31	8.71	8.97	8.73	7.89	11.74
1921	8.51	8.53	8.33	8.09	7.63	7.39	8.45	7.50	9.00	8.89	8.48	9.00	8.22
1922	7.74	8.00	7.94	8.50	9.45	9.58	9.96	10.56	10.44	10.59	10.57	10.25	9.36
1923	10.38	9.20	10.75	10.21	10.19	10.43	10.51	11.17	11.41	11.67	11.39	11.13	10.63
1924	10.99	10.74	10.39	10.16	10.33	10.52	11.05	11.72	12.73	12.00	10.99	11.41	10.62
1925	9.88	10.51	10.30	10.65	9.87	9.51	9.48	9.82	9.94	9.92	10.22	9.79	9.99
1926	9.37	9.17	8.94	9.42	9.48	10.12	10.33	10.50	11.04	10.63	10.62	10.17	9.45
1927	9.62	9.69	9.78	9.98	9.74	9.55	9.74	10.11	10.35	10.52	10.91	10.24	9.87
1928	10.38	10.25	10.71	11.96	12.69	12.67	13.19	13.84	14.19	14.69	14.91	14.68	11.37
1929	13.52	12.85	11.68	10.83	11.10	11.15							

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of alfalfa seed for each State; yearly price obtained by weighting monthly prices by monthly marketings.

[1] Straight crop year average until 1924.

TABLE 344.—*Clover seed: Estimated average price per bushel, received by producers, United States, 1920–1929*

Year beginning September	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	17.77	13.18	11.64	10.28	10.82	10.61	10.98	10.80	10.71	10.20	10.00	10.37	11.81
1921	10.25	10.21	10.09	10.38	10.69	11.88	13.00	13.13	12.84	11.60	11.00	9.88	11.14
1922	8.85	9.66	10.18	10.88	11.16	11.52	11.71	11.48	11.20	10.84	10.94	10.46	10.71
1923	11.07	12.20	12.18	12.22	12.51	12.67	13.04	13.09	13.07	12.72	12.42	12.09	12.38
1924	12.15	12.80	13.42	15.31	16.17	16.95	18.19	17.40	16.82	15.48	15.67	14.86	15.35
1925	13.42	14.12	14.85	15.48	16.04	16.83	17.45	17.88	18.08	17.16	17.17	16.83	15.87
1926	16.63	17.21	17.85	17.89	19.07	20.18	21.16	22.75	22.45	22.07	20.69	17.94	19.06
1927	16.78	15.67	15.07	15.33	15.97	16.37	16.90	16.92	17.04	16.89	16.42	15.90	16.11
1928	16.26	16.49	16.68	16.81	16.96	17.37	17.54	17.96	17.90	17.62	17.17	16.30	16.99
1929	12.48	10.68	9.75	9.94	------	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of clover seed for each State; yearly prices obtained by weighting monthly prices by average monthly marketings.

TABLE 345.—*Timothy seed: Estimated average price per bushel, received by producers, United States, 1920–1929*

Year beginning August	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	4.44	3.52	3.25	3.09	3.16	3.04	2.75	2.97	2.84	2.90	2.99	2.98	3.29
1921	2.71	2.31	2.70	2.41	2.57	2.70	2.82	2.95	3.11	3.21	2.81	2.53	2.64
1922	2.20	2.28	2.48	2.49	2.69	3.06	2.98	3.00	2.99	2.87	2.92	3.16	2.60
1923	2.63	3.01	3.12	3.15	3.19	3.37	3.56	3.60	3.54	3.48	3.44	3.23	3.19
1924	3.20	3.12	3.16	2.88	3.03	3.04	3.03	3.15	3.24	3.10	3.05	3.47	3.11
1925	3.36	3.21	3.21	3.31	3.41	3.38	3.56	3.51	3.47	3.36	3.41	3.26	3.33
1926	2.68	2.55	2.61	2.46	2.58	2.62	2.70	2.69	2.76	2.69	2.76	2.58	2.61
1927	2.06	1.66	1.58	1.61	1.73	1.78	1.92	1.86	1.88	1.96	2.08	2.07	1.77
1928	1.86	1.91	2.08	2.20	2.20	2.41	2.49	2.62	2.67	2.65	2.56	2.36	2.20
1929	1.69	1.88	2.02	2.17	2.25	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production of timothy seed for each State; yearly prices obtained by weighting monthly prices by average monthly marketings.

TABLE 346.—*Field seeds: Average wholesale selling price per 100 pounds at specified markets, by months, 1920–1929*

Year	Alfalfa, common, Kansas City					Alsike clover, Chicago				
	Jan.	Feb.	Mar.	Apr.	May	Jan.	Feb.	Mar.	Apr.	May
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1920	42.00	42.00	40.25	39.00	37.60	55.80	57.50	58.00	53.25	43.20
1921	18.50	18.00	18.40	18.50	18.15	25.65	22.40	22.45	21.60	19.50
1922	16.90	18.00	18.50	17.90	18.50	18.20	19.25	19.00	17.30	17.30
1923	19.50	19.50	19.50	20.65	21.00	16.50	16.50	16.50	16.45	16.35
1924	21.50	21.50	23.30	23.00	23.00	15.55	15.45	15.45	15.90	16.00
1925	22.00	22.10	22.60	23.50	23.25	21.75	22.40	23.05	24.75	25.00
1926	20.00	20.00	20.00	21.00	21.00	26.08	27.25	27.88	28.19	28.38
1927	19.50	20.00	20.00	20.00	20.00	36.01	37.94	39.44	38.71	34.56
1928	21.50	22.00	21.50	22.00	22.00	28.35	28.06	27.80	27.70	27.09
1929	26.00	26.00	26.00	26.00	26.00	34.40	34.25	35.20	35.40	34.20
	Red clover, Chicago					Sweet clover, Minneapolis				
1920	55.20	57.00	56.30	50.25	43.20	33.30	36.25	36.50	32.25	29.00
1921	21.25	18.05	20.80	19.95	18.55	10.65	10.00	10.00	9.60	9.00
1922	22.20	24.55	25.45	23.35	21.95	8.00	8.25	8.50	8.90	9.00
1923	22.55	22.45	20.60	19.70	19.35	12.40	12.00	12.40	13.00	12.25
1924	23.10	21.55	21.10	19.60	19.00	15.00	15.00	15.40	15.90	15.10
1925	34.20	36.00	34.30	33.40	32.00	13.00	13.00	12.75	11.94	11.00
1926	32.17	33.50	34.69	34.00	34.00	9.00	9.46	9.89	9.96	10.00
1927	38.60	42.31	45.00	44.25	42.38	14.38	14.31	14.00	13.00	12.50
1928	32.50	30.65	30.08	30.22	29.70	8.75	8.65	8.44	8.46	8.38
1929	33.00	33.40	34.60	34.40	33.20	8.50	8.50	8.50	8.50	8.50
	Kentucky bluegrass, Kansas City					Timothy, Chicago				
1920	29.70	30.75	30.75	30.50	30.00	13.50	13.90	13.30	12.65	12.30
1921	25.50	27.00	27.75	30.60	34.00	7.10	6.50	6.40	6.40	6.45
1922	50.00	52.50	55.00	55.00	55.00	7.05	7.30	7.30	6.60	6.70
1923	25.00	25.00	25.00	26.90	27.50	7.00	7.00	7.05	7.05	7.00
1924	25.10	25.40	25.00	25.00	25.00	8.15	8.25	8.10	7.75	7.55
1925	28.00	28.00	28.00	28.00	28.00	6.95	6.70	6.50	6.85	7.00
1926	40.00	39.25	37.00	37.00	37.00	8.10	8.10	7.99	7.78	7.75
1927	20.25	21.00	21.00	20.25	20.00	6.08	6.08	5.86	5.98	5.98
1928	19.50	19.60	19.50	20.00	20.00	4.75	4.55	4.32	4.75	5.30
1929	31.20	31.10	31.25	31.50	31.50	6.75	6.70	6.60	6.50	6.20

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 347.—*Seeds: Average price per 100 pounds, specified markets, 1920–1929*

Year	Alfalfa, Kansas City	Alsike clover, Chicago	Red clover, Chicago	Kentucky blue-grass, Kansas City	Timothy, Chicago	Sweet clover, Minneapolis	Meadow fescue, Kansas City	Lespedeza, Louisville	German millet, Kansas City	Amber sorgo, Kansas City	Hairy vetch, Baltimore	Sudan grass, Kansas City
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	40.20	53.60	52.40	30.30	13.10	33.50		32.90		2.75	27.60	12.80
1921	18.30	22.30	19.70	29.00	6.60	9.80		21.80		1.40	9.70	3.00
1922	18.00	18.20	23.50	53.50	7.00	8.50	15.90	17.10		2.00	12.00	4.70
1923	20.00	16.50	20.90	25.90	7.00	12.40	10.00	19.00		4.25	16.80	15.10
1924	22.30	15.70	20.90	25.10	8.00	15.30	10.60	21.10	4.00	1.70	10.40	8.20
1925	22.70	23.40	34.00	28.00	6.80	12.30	9.40		5.00	2.20	8.90	5.70
1926	20.40	27.60	33.70	38.00	7.90	9.70	15.50	15.20	3.10	2.80	12.30	4.20
1927	19.90	37.30	42.50	20.50	6.00	13.60	25.00	8.20	3.30	3.30	15.20	7.00
1928	21.80	27.80	30.60	19.70	4.70	8.50	14.60	18.80	2.40	2.00	9.70	3.70
1929	26.00	34.70	33.70	31.30	6.60	8.50	16.00	20.60	3.40	2.10	9.30	5.60

Bureau of Agricultural Economics. Compiled from weekly reports to the bureau from seedsmen in the various markets. These prices are the average wholesale selling prices for high-quality seed.

TABLE 348.—*Forage plant seed: Imports into United States, 1916–1929* [1]

Kind of seed	Year ended June 30													
	1916	1917	1918	1919	1921	1922	1923	1923	1924	1925	1926	1927	1928	1929
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Alfalfa	3, 252	3, 170	45	770	18, 831	942	7, 259	8, 784	12, 818	4, 783	4, 548	5, 134	782	1, 146
Canada bluegrass	698	495	1, 229	739	552	1, 148	1, 034	836	817	1, 150	284	882	1, 102	1, 228
Awnless brome grass	(2)	1	------	------	169	9	14	------	------	------	11	------	(2)	5
Alsike clover	1, 113	4, 329	3, 528	7, 032	5, 648	4, 121	7, 057	5, 566	11, 056	10, 425	10, 989	4, 163	7, 609	4, 798
Crimson clover	4, 504	5, 776	1, 603	1, 484	10, 053	5, 566	3, 443	2, 262	7, 745	4, 834	5, 766	2, 385	1, 346	3, 395
Red clover	32, 509	5, 344	768	1, 051	19, 268	16, 333	10, 391	448	24, 729	6, 541	19, 725	10, 816	4, 641	7, 547
White clover	149	158	53	1	189	516	1, 623	520	1, 408	1, 227	1, 666	975	1, 778	2, 410
Biennial white sweet clover	(3)	195	71	941	2, 215	3, 133	------	------	4, 039	3, 493	5, 879	4, 130	3, 379	1, 464
Biennial yellow sweet clover	(3)	9	------	1	202	235	------	------	222	52	502	174	116	29
Clover mixtures	------	26	169	550	265	23	57	20	74	13	122	24	41	250
Grass mixtures	------	124	6	(2)	3	6	43	(3)	------	200	(2)	------	------	5
Spring vetch and oats mixtures	------	------	------	------	------	4	------	------	------	------	------	------	------	------
Meadow fescue	------	------	------	------	3	------	1	------	(2)	1	13	16	(2)	8
Broomcorn millet	1, 102	786	1, 584	------	225	152	1, 496	5, 360	595	253	456	(4)	(4)	(4)
Foxtail millet	118	260	9	138	146	434	302	65	184	243	125	------	30	108
Orchard grass	754	1, 286	58	177	2, 771	------	2, 922	768	603	992	253	260	173	2, 377
Rape	4, 019	2, 286	11, 316	639	5, 766	4, 245	4, 763	6, 384	6, 600	4, 345	6, 526	6, 788	6, 438	6, 982
Perennial ryegrass	1, 510	1, 668	1, 584	831	1, 958	1, 523	1, 868	1, 834	1, 952	1, 335	2, 302	1, 203	1, 083	1, 180
Italian ryegrass	383	481	606	208	980	577	828	860	1, 034	831	1, 683	833	456	300
Timothy	119	4	22	155	37	391	95	32	(2)	1	3	45	23	(2)
Hairy vetch	68	296	231	257	1, 220	1, 387	1, 941	1, 599	3, 215	2, 068	3, 986	2, 124	3, 895	4, 064
Spring vetch	62	30	118	435	1, 048	542	345	1, 858	1, 210	1, 266	1, 603	992	563	1

Bureau of Agricultural Economics. Compiled mainly from data of the Seed Laboratory, Bureau of Plant Industry.

[1] Imports of perennial and Italian ryegrass and hairy vetch up to and including 1917, and sweet clover for all years, are based on information furnished by United States Customs Service. All other figures represent imports of seed permitted entry under the Federal seed act (formerly designated the seed importation act).
[2] Less than 500 pounds.
[3] Figures missing.
[4] Data not compiled for 1927–1929.

BEEF CATTLE, HOGS, SHEEP, HORSES, AND MULES

TABLE 349.—*All cattle and beef cattle: Number and value per head in the United States, 1840, 1850, 1860, 1867–1929*

Year	Cattle on farms: All cattle [1]	Cattle on farms: Other than milk cows: Number [2]	Cattle on farms: Other than milk cows: Value per head, Jan. 1 [3]	Beef cattle on farms and elsewhere, Jan. 1 [4]
	Thousands	*Thousands*	*Dollars*	*Thousands*
1840 [5]	*14,972*			
1850 [5]	*16,078*	*9,693*		14,400
1860 [5]	*23,365*	*14,779*		18,900
1867	20,080	11,731	15.79	12,600
1868	20,634	11,942	15.06	13,600
1869	21,433	12,185	18.73	14,800
1870 [5]	*22,501*	*13,566*		
1870	25,484	15,388	18.87	20,000
1871	26,235	16,212	20.78	21,000
1872	26,694	16,390	18.12	21,100
1873	26,990	16,414	18.06	20,900
1874	26,923	16,218	17.55	20,500
1875	27,220	16,313	16.91	20,400
1876	27,870	16,785	17.00	20,800
1877	29,217	17,956	15.99	22,200
1878	30,523	19,223	16.72	23,800
1879	33,234	21,408	15.38	26,400
1880 [5]	*34,932*	*22,489*		
1880	33,258	21,231	16.10	25,900
1881	33,308	20,939	17.33	24,900
1882	35,892	23,280	19.89	27,600
1883	41,172	28,046	21.81	33,400
1884	42,547	29,046	23.52	34,100
1885	43,772	29,867	23.25	34,400
1886	45,510	31,275	21.17	35,700
1887	48,034	33,512	19.79	37,900
1888	49,234	34,378	17.79	38,300
1889	50,331	35,032	17.05	38,300
1890 [5]	*50,246*	*33,734*		
1890	52,802	36,849	15.21	39,800
1891	52,896	36,876	14.76	40,900
1892	54,067	37,651	15.16	42,000
1893	52,378	35,954	15.24	40,500
1894	53,095	36,608	14.66	43,700
1895	50,869	34,364	14.06	41,700
1896	48,223	32,085	15.86	39,700
1897	46,450	30,508	16.65	38,700
1898	45,105	29,264	20.92	38,000
1899	43,984	27,994	22.79	37,100
1900	[6] 43,902	27,610	23.60	34,170
1900 [5]	*67,720*	*50,584*		
1900	57,518	41,226		
1901	60,544	43,710	18.83	36,382
1902	62,215	45,518	17.73	37,252
1903	63,788	46,677	17.44	37,716
1904	64,137	46,717	15.42	37,924
1905	64,003	46,431	14.32	36,826
1906	62,872	43,078	14.98	35,202
1907	62,373	41,405	16.16	35,636
1908	60,794	39,600	15.96	33,997
1909	59,634	37,914	16.53	32,547
1910 [5]	*61,803*	*41,178*		
1910	57,940	37,315	18.02	30,874
1911	56,219	35,396	19.41	29,163
1912	55,022	34,323	20.03	27,622
1913	55,833	35,336	24.91	27,806
1914	58,737	38,000	29.42	29,039
1915	62,532	41,270	31.54	31,177
1916	66,394	44,286	31.69	33,953
1917	69,533	46,639	33.91	36,059
1918	71,229	47,919	38.63	38,070
1919	70,261	46,786	41.79	38,056
1920 [5]	*66,639*	*46,934*		
1920	68,871	47,444	39.93	36,995
1921	67,184	45,776	28.92	35,629
1922	67,264	45,476	21.87	35,385
1923	66,156	44,093	23.44	33,718
1924	64,507	42,252	23.07	31,779
1925 [5]	*60,760*	*43,115*		
1925	61,996	39,515	22.58	28,711
1926	59,122	36,934	26.42	26,608
1927	56,832	35,031	28.28	24,585
1928	55,681	33,857	36.38	23,915
1929	[7] 55,751	33,931	43.12	23,810

Bureau of Agricultural Economics. Later, revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as base on first report after census data were available. Figures 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 Yearbook.

[2] Obtained by subtracting the estimates of "milk cows on farms" shown in Table 438 from the estimates of "all cattle on farms" shown in this table.

[3] Series for 1867–1899 are estimates as currently reported. Data for 1900–1925 are an old series adjusted on basis average relationship between the old and new series from 1926 to 1928. Old series was weighted averages of prices by age groups only and was shown in 1928 Yearbook. The conversion factor was .9466 (base is old series). Data for 1926–1929 are a new series, referred to above, of average values by age and sex classification weighted by numbers in each class.

[4] Data for beef cattle on farms and elsewhere as of Jan. 1 estimated by the Bureau of Animal Industry. Prior to 1920 census figures were adjusted to a January 1 basis and to include all ages and all animals in towns villages and ranges, as well as on farms. For methods, see Department Circular 241. Revisions have been made by the Bureau of Animal Industry for 1900–1929 in line with revision of estimates of cattle on farms.

[5] Italic figures for census years represent classification of cattle as follows: 1840 reported as "neat cattle," 1880 and 1890 exclude an estimated number of unenumerated cattle on ranges as follows: 1880, 3,750,022; 1890, 6,285,220. No estimate made prior to 1880. Figures for censuses prior to 1900 were nominally exclusive of calves, though some calves may have been included. 1900, 1910, and 1920 include calves. 1850–1890 exclude working oxen as follows: 1850, 1,700,744; 1860, 2,254,911; 1870, 1,319,371; 1880, 993,841; 1890, 1,117,494. Not separately reported after 1890. Census dates were June 1 from 1840 to 1900; April 15, 1910; January 1, 1920 and 1925.

[6] Original estimate of the Bureau of Agricultural Economics.

[7] Preliminary.

TABLE 350.—*All cattle and calves, including cows and heifers kept for milk: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	211	235	233	224	228	40.70	50.40	51.20	57.80	66.60
New Hampshire	125	119	113	112	115	45.70	56.90	64.10	79.30	88.70
Vermont	403	401	403	412	422	44.10	53.80	60.70	76.70	78.60
Massachusetts	195	187	181	181	183	62.40	71.50	81.60	102.80	106.60
Rhode Island	27	27	27	27	28	71.00	76.50	89.30	109.30	118.50
Connecticut	160	151	144	142	144	64.00	74.20	82.70	109.90	118.30
New York	1,852	1,824	1,808	1,865	1,895	52.10	66.70	74.20	90.60	100.40
New Jersey	154	154	157	161	163	64.80	81.40	87.90	102.40	114.20
Pennsylvania	1,318	1,298	1,289	1,332	1,372	48.30	58.40	60.70	77.10	86.90
North Atlantic	4,475	4,396	4,355	4,456	4,550	50.89	62.99	68.63	85.00	93.76
Ohio	1,675	1,616	1,608	1,624	1,640	43.50	49.20	52.50	64.30	71.30
Indiana	1,282	1,282	1,320	1,294	1,307	42.50	46.00	48.90	59.00	67.00
Illinois	2,345	2,251	2,161	1,967	1,967	41.80	48.20	50.00	59.30	69.00
Michigan	1,406	1,420	1,406	1,406	1,406	45.20	49.90	54.00	66.50	77.00
Wisconsin	3,035	3,005	2,960	2,920	2,862	42.60	53.20	57.20	69.90	79.20
Minnesota	2,853	2,853	2,710	2,710	2,737	35.70	42.20	43.00	54.40	63.40
Iowa	4,372	4,241	4,029	3,720	3,845	37.50	42.40	44.00	54.20	61.90
Missouri	2,442	2,369	2,174	2,109	2,109	30.70	33.20	37.40	47.60	57.80
North Dakota	1,341	1,260	1,100	1,067	1,078	27.30	30.80	33.30	43.70	53.80
South Dakota	2,074	1,919	1,635	1,570	1,570	29.30	33.20	35.40	47.90	55.90
Nebraska	3,314	3,191	2,819	2,766	2,766	31.40	35.80	37.00	49.40	59.30
Kansas	3,068	2,853	2,568	2,696	2,831	29.50	34.40	35.70	45.20	53.70
North Central	29,207	28,260	26,490	25,849	26,118	35.98	41.47	44.10	55.13	63.95
Delaware	46	48	48	49	50	50.00	53.60	60.30	77.60	93.70
Maryland	273	270	265	275	283	48.30	54.30	54.70	69.90	79.50
Virginia	827	744	707	729	765	31.20	32.40	35.00	47.10	54.80
West Virginia	591	526	473	482	496	30.90	33.30	36.30	52.00	60.40
North Carolina	545	523	486	496	506	28.50	30.00	34.80	44.70	48.30
South Carolina	341	300	280	275	272	24.30	23.90	28.40	34.10	38.90
Georgia	938	854	854	837	820	17.30	19.10	20.50	27.00	31.10
Florida	656	630	592	533	480	16.50	17.50	17.00	17.60	23.40
South Atlantic	4,217	3,895	3,705	3,676	3,672	26.18	28.00	30.15	39.70	46.52
Kentucky	938	910	910	955	955	26.80	30.60	35.40	46.90	52.00
Tennessee	1,023	921	912	958	977	20.80	23.70	28.50	38.90	43.60
Alabama	840	739	746	709	702	16.10	17.70	20.50	27.80	32.40
Mississippi	938	845	853	879	835	14.20	18.20	18.90	25.80	30.10
Arkansas	837	795	795	772	772	15.20	17.90	20.60	29.90	34.20
Louisiana	720	648	616	579	585	17.80	19.20	20.70	23.70	31.90
Oklahoma	1,695	1,610	1,723	1,723	1,723	21.10	25.40	30.90	39.70	45.20
Texas	6,275	5,900	5,841	5,607	5,607	20.60	21.40	27.20	37.60	42.20
South Central	13,266	12,368	12,396	12,182	12,156	19.89	21.98	26.68	36.16	41.12
Montana	1,340	1,280	1,114	1,114	1,103	28.70	31.10	33.00	46.00	57.90
Idaho	650	624	605	588	570	28.50	36.90	41.00	48.60	57.20
Wyoming	795	787	771	764	764	27.90	34.40	37.60	49.00	62.10
Colorado	1,465	1,377	1,418	1,317	1,317	26.00	32.00	36.20	46.70	55.30
New Mexico	1,290	1,213	1,189	1,070	1,017	21.50	27.00	29.20	38.90	46.50
Arizona	1,069	863	794	675	540	24.30	31.50	32.70	40.00	48.80
Utah	507	482	472	460	460	26.40	35.90	37.30	45.60	57.50
Nevada	419	385	350	332	315	24.10	36.20	35.80	46.40	59.80
Washington	582	558	580	530	541	43.70	44.40	50.00	58.20	72.40
Oregon	796	716	687	673	673	34.40	38.60	40.00	49.50	60.10
California	1,918	1,918	1,956	1,995	1,955	41.90	46.80	47.70	53.70	64.50
Far Western	10,831	10,203	9,886	9,518	9,255	30.25	35.98	38.44	47.79	58.49
United States	61,996	59,122	56,832	55,681	55,751	31.95	37.16	40.29	51.10	59.35

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Sum of total value of subgroups (classified by age and sex), divided by total number and rounded to nearest dime for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published.

[2] Preliminary.

TABLE 351.—*Cattle: Number in countries having 150,000 or over, average 1909–1913 and 1921–1925, annual 1926–1929*

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
NORTH AMERICA AND WEST INDIES		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Canada	June	6, 551	9, 588	8, 571	9, 172	8, 793	8, 931
United States	January	56, 750	65, 421	59, 122	56, 832	55, 676	56, 467
Mexico	June	[2 3] 5, 142	[4] 2, 492	5, 585	-------	-------	-------
Guatemala	July	557	268	564	310	298	-------
Honduras	-------	411	[5] 466	-------	-------	-------	-------
Salvador	-------	350	-------	-------	-------	-------	-------
Nicaragua	-------	[3] 252	[6] 1, 200	-------	-------	-------	-------
Costa Rica	-------	333	435	423	478	403	-------
Cuba	December [7]	2, 917	4, 841	3, 783	-------	4, 584	-------
Dominican Republic	May	-------	640	-------	-------	-------	-------
Porto Rico	-------	[3] 316	279	-------	-------	-------	-------
Estimated total [8]	-------	74, 900	86, 600	-------	-------	-------	-------
SOUTH AMERICA							
Colombia	-------	4, 000	7, 468	6, 500	6, 727	-------	-------
Venezuela	-------	2, 004	2, 689	-------	-------	-------	-------
Ecuador	-------	-------	[9] 1, 500	1, 280	-------	-------	[9] 1, 285
Peru	February	-------	1, 198	-------	-------	-------	-------
Bolivia	-------	734	2, 145	2, 320	-------	-------	-------
Chile	-------	1, 780	1, 957	-------	-------	-------	-------
Brazil [10]	September	30, 705	[3 11] 34, 271	-------	-------	-------	-------
Uruguay	-------	[3 6] 8, 193	[3] 8, 432	-------	-------	-------	[9] 9, 153
Paraguay	December [7]	4, 422	4, 600	-------	-------	-------	-------
Argentina	do.[7]	[3 12] 25, 867	[3] 37, 065	-------	-------	-------	[9] 34, 410
Estimated total [8]	-------	80, 300	101, 500	-------	-------	-------	-------
EUROPE							
England and Wales	June	5, 843	5, 824	6, 253	6, 275	6, 026	5, 956
Isle of Man	do	21	19	19	19	19	-------
Scotland	do	1, 203	1, 171	1, 198	1, 210	1, 214	1, 224
Northern Ireland	do	786	748	667	697	738	700
Irish Free State	do	4, 061	4, 266	3, 947	4, 047	4, 125	4, 137
Norway [13]	do	[14] 1, 134	1, 128	1, 200	1, 209	1, 221	-------
Sweden	do	3, 069	2, 418	-------	2, 898	-------	-------
Denmark	July	2, 717	2, 613	2, 838	2, 913	3, 016	3, 031
Holland	May–June	[3] 2, 062	[3] 2, 063	-------	-------	-------	-------
Belgium	December [7]	1, 925	1, 550	1, 655	1, 712	1, 739	1, 751
France	do.[7]	15, 338	13, 582	14, 373	14, 482	14, 941	15, 005
Spain	do.[7]	2, 587	3, 457	3, 794	3, 688	-------	-------
Portugal	-------	[3 15] 703	754	-------	-------	-------	-------
Italy [10]	March–April	6, 590	6, 812	[9] 7, 400	-------	-------	-------
Switzerland	April	[3] 1, 443	[3] 1, 425	1, 587	-------	-------	-------
Germany	December [7]	18, 474	16, 786	17, 202	17, 221	18, 011	18, 390
Austria	December–April	2, 356	2, 241	-------	-------	-------	[9] 2, 330
Czechoslovakia	December [7]	4, 596	4, 377	4, 690	-------	-------	-------
Hungary	April	2, 150	1, 866	1, 847	1, 805	1, 812	1, 819
Yugoslavia [10]	January	5, 155	4, 122	3, 738	3, 760	3, 686	-------
Greece [10]	December [7]	665	742	890	964	947	955
Bulgaria [10]	do.[7]	2, 048	1, 928	-------	2, 266	-------	-------
Rumania [10]	do.[7]	5, 648	5, 570	5, 219	4, 992	4, 744	4, 625
Poland	November	8, 664	8, 063	-------	8, 602	-------	-------
Lithuania	-------	918	1, 149	1, 396	1, 128	1, 199	-------
Latvia	June	912	867	955	967	961	[9] 975
Esthonia	July	528	508	599	634	651	605
Finland	September	1, 605	1, 847	1, 860	1, 872	1, 917	-------
Russia, European and Asiatic [16]	Summer	[17] 60, 280	57, 278	63, 025	65, 952	69, 066	66, 693
Estimated total, excluding Russia.[8]	-------	103, 300	98, 000	-------	-------	-------	-------
AFRICA							
Morocco	-------	[19] 675	1, 711	1, 933	1, 865	1, 816	-------
Algeria	September	1, 112	853	946	849	887	-------
Tunis	December [7]	195	459	370	468	501	-------
French West Africa	-------	-------	2, 165	2, 329	2, 402	3, 441	-------
French Sudan	-------	-------	1, 086	910	1, 030	909	-------
Nigeria	-------	-------	2, 805	3, 162	2, 997	3, 073	-------
French Cameroon	-------	-------	354	332	342	400	-------
Egypt [10]	September	1, 316	1, 310	1, 485	1, 497	1, 580	-------
Anglo-Egyptian Sudan	-------	-------	864	1, 500	1, 501	1, 503	-------
Italian Somaliland	February	-------	[3 11] 1, 246	-------	-------	1, 106	1, 112
Eritrea	-------	517	553	-------	748	-------	-------
Kenya Colony	March–June	754	3, 038	3, 413	3, 476	3, 482	-------
Uganda	December [7]	556	1, 109	1, 342	1, 338	1, 733	1, 710
French Equatorial Africa	-------	-------	815	881	-------	-------	-------
Belgian Congo	-------	500	495	465	495	485	-------
Ruanda-Urundi	-------	-------	700	750	771	950	-------
Portuguese East Africa	-------	-------	341	380	425	437	-------

See footnotes at end of table.

TABLE 351.—*Cattle: Number in countries having 150,000 or over, average 1909–1913 and 1921–1925, annual 1926–1929*—Continued

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
AFRICA—continued		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
British Southwest Africa		206	561	621	585		
Bechuanaland		[3] 324	482	518	598	625	
Union of South Africa	April-May	[3] 5,797	9,459	10,514	10,590	[19] 10,655	
Basutoland		[3] 437	604	645	659	650	
Rhodesia:							
Northern	December [7]	255	289	382	363	416	441
Southern	do.[7]	509	1,794	2,102	2,189	2,327	2,326
Swaziland		60	232	300	350		
Tanganyika Territory		2,095	3,806	4,479	4,706	4,895	
Madagascar	February	4,890	7,708		7,362	6,901	
Estimated total [8]		30,700	46,500				
ASIA							
Turkey, European and Asiatic.[20]		6,438	4,265	5,916	6,934		
Persia			[9] 1,000				
Syria and Lebanon			257	243	220		
India: [10]							
British	December-April	128,451	146,759	150,832	151,288	151,156	
Native States	do	13,258	33,982	33,276	34,544		
Ceylon [10]	December [7]	1,484	1,459	1,457	1,537	1,588	1,618
China (includes Turkestan and Manchuria).		21,997					
Japan	December [7]	1,385	1,440	1,460	1,465	1,474	
Chosen [10]	do	966	1,567	1,591	1,595	1,586	1,570
Formosa [10]	do	473	407	379	381	386	388
French-Indo China [10]		[17] 4,616	3,474				
Siam [10]	March	4,501	6,701	8,230	8,495	8,657	
Philippine Islands [10]	December [7]	1,190	2,393	2,622	2,846	3,089	
Dutch East Indies:							
Java and Madura [10]	do	5,091	5,287	5,721	5,680	5,781	
Outer possessions [10]	do	1,640	1,872	1,965	1,952	1,983	
Estimated total, excluding Russia.[8]		195,100	235,000				
OCEANIA							
Australia	December [7]	11,535	13,789	13,280	11,963	11,617	
New Zealand	January	[3] 2,020	3,393	3,452	3,258	3,274	3,446
Estimated total [8]		13,800	17,400				
Total countries reporting all periods, including Russia:							
Pre-war to 1928 (47)[21]		365,815	407,824	417,144	418,204	421,847	
Pre-war to 1929 (23)[21]		190,104	198,398	199,066	200,536	203,770	202,761
Estimated world total, including Russia.[8]		558,400	642,300				

Bureau of Agricultural Economics. Compiled from official sources and the International Institute of Agriculture unless otherwise stated.

[1] Average for 5-year period if available, otherwise for any year or years within this period except as otherwise stated. In countries, having changed boundaries, the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Year 1902.
[3] Census.
[4] Incomplete.
[5] Year 1918.
[6] Year 1908.
[7] Estimates reported as of December have been considered as of Jan. 1 of the following year, i. e., figures for number of cattle in France as of Dec. 31, 1925, have been put in the 1926 column.
[8] This total includes interpolations for a few countries not reporting each year and rough estimates for some others.
[9] Unofficial.
[10] Buffaloes included.
[11] Year 1920.
[12] June, 1914.
[13] In rural communities only.
[14] September.
[15] Year 1906.
[16] Years 1916, 1923–1927 from Soviet Union Review, April, 1928. Years 1928 and 1929, Economic Life, Aug. 14, 1929, quoting Central Statistical Bureau.
[17] Year 1916.
[18] Year 1915.
[19] Number in towns assumed to be same as in 1927, i. e., 177,000 and added in for purposes of comparison with preceding years.
[20] In addition there were 832,163 buffaloes in pre-war times, 552,596 in 1926 and 794,595 in 1927.
[21] Comparable totals for number of countries indicated.

TABLE 352.—*Cattle and calves: Receipts at principal public stockyards and at all public stockyards, 1909–1929*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	St. Joseph	South St. Paul	Sioux City	Total 9 markets [1]	All other stockyards reporting [2]	Total all stockyards reporting [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1909	3,340	426	1,241	1,197	2,660	1,125	592	497	426	11,504	--------	--------
1910	3,553	399	1,208	1,071	2,507	1,224	565	604	439	11,570	--------	--------
1911	3,453	298	1,072	884	2,370	1,174	513	539	487	10,790	--------	--------
1912	3,158	416	1,200	1,039	2,147	1,017	494	524	431	10,426	--------	--------
1913	2,888	499	1,100	1,185	2,319	962	450	532	394	10,329	--------	--------
1914	2,601	443	1,041	1,176	1,957	939	356	585	368	9,466	--------	--------
1915	2,685	424	992	944	1,963	1,218	441	856	534	10,057	4,496	14,553
1916	3,250	601	1,200	1,081	2,331	1,434	480	941	602	11,920	5,756	17,676
1917	3,820	653	1,405	1,960	2,902	1,720	670	1,197	707	15,034	8,032	23,066
1918	4,448	728	1,509	1,665	3,320	1,993	870	1,430	818	16,781	8,514	25,295
1919	4,253	824	1,473	1,267	3,085	1,975	750	1,491	814	15,932	8,697	24,629
1920	3,849	617	1,254	1,134	2,500	1,603	643	1,373	752	13,725	8,472	22,197
1921	3,540	482	1,077	984	2,469	1,435	558	985	620	12,150	7,637	19,787
1922	3,934	656	1,400	1,084	2,983	1,744	655	1,387	747	14,590	8,628	23,218
1923	3,918	620	1,399	1,258	3,208	1,793	709	1,349	759	15,013	8,198	23,211
1924	3,997	630	1,385	1,392	3,043	1,863	720	1,323	836	15,189	8,506	23,695
1925	3,871	587	1,444	1,370	2,958	1,709	734	1,636	897	15,206	8,861	24,067
1926	4,012	529	1,526	1,185	2,617	1,815	679	1,910	969	15,242	8,630	23,872
1927	3,583	640	1,448	1,286	2,470	1,561	641	1,582	809	14,020	8,743	22,763
1928	3,267	667	1,315	1,211	2,210	1,518	598	1,490	813	13,089	8,389	21,478
1929	3,060	624	1,223	1,089	2,178	1,546	590	1,425	839	12,574	7,866	20,440

Bureau of Agricultural Economics. Prior to 1915 figures compiled from yearbooks of stockyard companies; subsequent figures compiled from data of the livestock and meat reporting service of the bureau. Receipts 1900–1908 are available in 1924 Yearbook, p. 840, Table 435.

[1] Total of the rounded detail figures.
[2] Totals for all stockyards not available prior to 1915.

TABLE 353.—*Cattle and calves: Receipts and stocker and feeder shipments at all public stockyards, 1915–1929*

RECEIPTS, CATTLE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1915	906	664	849	766	875	897	858	1,083	1,355	1,630	1,535	1,024	12,442
1916	1,043	892	976	862	1,078	1,051	948	1,346	1,548	2,134	1,716	1,257	14,851
1917	1,456	1,092	1,069	1,205	1,581	1,454	1,415	1,513	2,044	2,657	2,308	1,670	19,464
1918	1,500	1,284	1,408	1,634	1,432	1,450	1,730	1,697	2,411	2,484	2,340	1,871	21,241
1919	1,795	1,208	1,179	1,318	1,382	1,195	1,511	1,618	1,978	2,526	2,293	1,816	19,819
1920	1,514	1,147	1,207	1,090	1,303	1,343	1,203	1,458	1,789	1,744	1,978	1,084	16,860
1921	1,256	871	1,114	1,043	1,065	1,095	893	1,375	1,361	1,754	1,447	1,036	14,310
1922	1,222	1,044	1,145	1,009	1,358	1,217	1,255	1,608	1,802	2,243	1,846	1,392	17,141
1923	1,395	1,038	1,044	1,159	1,305	1,138	1,357	1,622	1,782	2,141	1,650	1,368	16,999
1924	1,388	1,041	1,084	1,161	1,317	1,172	1,254	1,398	1,938	2,096	1,796	1,528	17,173
1925	1,353	1,056	1,273	1,201	1,139	1,160	1,398	1,632	1,592	2,126	1,717	1,470	17,117
1926	1,314	1,065	1,233	1,146	1,277	1,279	1,279	1,421	1,827	2,030	1,836	1,327	17,034
1927	1,327	1,080	1,172	1,107	1,348	1,185	1,089	1,494	1,482	2,008	1,749	1,217	16,258
1928	1,272	1,045	966	1,119	1,188	1,057	1,158	1,308	1,669	1,913	1,419	1,075	15,189
1929	1,160	814	953	1,146	1,097	977	1,166	1,156	1,572	1,787	1,405	1,104	14,337

TABLE 353.—*Cattle and calves: Receipts and stocker and feeder shipments at all public stockyards, 1915–1929*—Continued

RECEIPTS, CALVES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1915	123	103	168	221	236	216	181	164	176	188	189	146	2,111
1916	159	162	225	289	307	269	206	238	230	275	261	203	2,824
1917	240	210	260	335	381	305	313	302	313	397	317	229	3,602
1918	228	214	305	411	431	365	398	327	415	381	308	271	4,054
1919	325	245	337	455	454	392	505	421	418	482	410	366	4,810
1920	366	333	456	467	475	536	467	504	506	466	450	311	5,337
1921	388	319	452	450	477	485	451	492	545	557	481	380	5,477
1922	406	372	477	461	520	542	456	541	595	693	581	433	6,077
1923	482	389	458	511	595	492	546	592	512	661	532	442	6,212
1924	500	415	472	590	574	502	544	536	628	640	567	555	6,523
1925	516	473	588	626	597	586	572	612	566	663	565	586	6,950
1926	526	486	578	564	616	592	541	576	570	644	625	519	6,837
1927	504	476	571	567	607	547	457	571	507	627	598	473	6,505
1928	499	471	499	566	610	501	492	521	522	629	544	435	6,289
1929	479	381	497	606	563	475	499	463	531	620	538	451	6,103
					STOCKER AND FEEDER SHIPMENTS, CATTLE								
1915	144	81	129	139	91	73	86	164	349	440	350	195	2,241
1916	211	193	241	255	280	258	167	322	448	653	434	245	3,707
1917	255	207	237	297	393	344	254	323	576	750	709	338	4,683
1918	215	206	306	377	481	386	268	410	588	674	598	355	4,864
1919	353	256	265	378	431	264	227	384	598	815	703	456	5,130
1920	336	230	230	233	311	262	214	308	480	563	540	274	3,981
1921	200	162	228	232	207	203	119	341	375	580	449	230	3,326
1922	223	234	266	223	338	243	216	453	595	792	630	331	4,544
1923	262	199	186	221	288	220	212	459	608	734	577	338	4,304
1924	231	165	167	230	267	191	161	293	556	724	497	288	3,770
1925	194	163	213	254	198	143	234	347	409	681	449	308	3,593
1926	207	164	171	190	201	158	188	240	495	648	521	273	3,456
1927	187	162	182	184	215	157	128	252	385	626	548	278	3,304
1928	215	175	154	236	263	165	175	312	525	704	420	218	3,562
1929	159	106	146	266	266	157	159	246	394	673	459	219	3,250
					STOCKER AND FEEDER SHIPMENTS, CALVES								
1915	3	1	2	3	3	3	2	4	8	14	11	6	60
1916	10	4	9	7	8	6	5	8	16	29	27	11	140
1917	5	6	12	9	8	9	7	8	12	21	20	6	123
1918	7	8	13	8	10	7	6	8	16	30	25	11	149
1919	11	8	12	12	12	8	9	12	14	24	20	14	156
1920	12	10	11	12	11	10	5	6	8	17	13	6	121
1921	5	4	8	6	7	6	3	14	19	42	48	16	178
1922	10	9	16	11	21	17	7	16	35	72	80	26	320
1923	19	12	13	11	12	14	11	21	23	51	47	15	249
1924	11	5	8	9	8	10	9	13	24	39	51	21	208
1925	12	13	17	17	18	11	9	13	18	37	40	25	230
1926	18	13	13	13	17	11	11	12	26	45	49	28	256
1927	18	13	18	20	21	13	10	19	22	49	67	41	311
1928	18	19	19	18	21	19	21	24	38	95	76	35	403
1929	19	11	16	26	28	19	14	20	29	85	97	37	401

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau.

NOTE.—Tables similar to Tables 353 and 354, 1928 Yearbook, receipts, local slaughter, and stocker and feeder shipments of cattle and of calves, are omitted.

TABLE 354.—*Feeder cattle, inspected: Shipments from public stockyards, by months, 1929*

Origin and destination	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Market origin:													
Chicago, Ill	8,410	8,324	8,950	7,788	7,036	3,672	5,165	10,594	21,366	39,727	23,200	13,195	157,427
Denver, Colo	34,355	6,957	9,139	12,188	43,436	21,644	5,826	3,728	23,569	91,035	59,722	22,829	334,428
East St. Louis, Ill	4,330	4,026	3,059	4,715	4,032	4,404	5,669	12,643	15,221	22,770	11,809	6,401	99,079
Fort Worth, Tex	9,500	8,989	12,222	47,361	23,019	14,721	12,204	11,301	19,920	27,412	33,832	16,408	236,889
Indianapolis, Ind	1,635	1,500	1,768	1,566	1,616	2,321	2,526	2,556	3,413	3,351	3,348	1,306	26,906
Kansas City, Kans	34,271	30,069	31,450	29,542	27,885	22,738	31,683	60,346	95,839	158,641	102,811	54,693	679,968
Louisville, Ky	622	1,427	1,359	2,087	1,499	625	1,144	1,493	1,883	2,710	1,309	396	16,554
Oklahoma City, Okla	5,853	3,054	4,846	8,697	6,716	5,320	4,366	7,318	7,768	15,195	11,360	4,877	85,370
Omaha, Nebr	18,313	12,627	14,376	15,376	11,286	9,181	8,101	26,275	73,549	111,505	67,458	30,400	398,447
Sioux City, Iowa	13,710	7,624	12,212	12,249	10,601	8,977	14,106	24,529	43,561	72,236	44,362	21,847	286,014
South St. Joseph, Mo	2,090	1,121	1,335	2,902	2,508	4,288	4,782	6,321	8,873	15,730	7,721	3,261	60,932
South St. Paul, Minn	7,056	4,369	8,267	13,488	14,177	10,192	17,419	28,102	28,691	38,097	27,355	11,545	208,758
Wichita, Kans	8,345	7,681	10,468	27,859	10,609	3,923	3,542	8,577	9,194	34,242	26,845	12,750	164,035
All other inspected	13,998	11,720	14,362	23,112	25,792	23,217	24,825	26,521	33,793	58,089	42,546	27,414	325,389
Total	162,488	109,488	133,813	208,930	190,212	135,223	141,358	230,304	386,640	690,740	463,678	227,322	3,080,196
State destination:													
Colorado	12,600	4,749	4,537	6,228	13,743	12,901	5,124	3,069	19,383	56,580	32,861	12,012	183,787
Illinois	14,604	10,835	11,189	13,164	11,148	11,076	18,565	34,787	53,257	70,251	42,178	21,878	312,932
Indiana	4,655	3,296	5,127	5,033	4,679	4,783	7,669	12,056	14,970	23,155	14,262	6,738	106,423
Iowa	24,534	13,857	21,075	20,140	18,532	17,621	25,672	50,910	88,247	132,382	85,078	40,201	538,249
Kansas	30,269	22,958	26,267	60,827	32,131	13,281	14,169	26,961	34,871	99,210	63,169	38,433	462,546
Kentucky	1,693	2,355	2,510	6,166	4,592	2,626	3,578	2,996	4,950	7,523	4,699	2,435	46,123
Michigan	1,010	861	1,563	2,040	3,328	2,246	2,799	3,427	3,685	7,246	4,414	1,793	34,412
Minnesota	956	241	1,185	1,797	2,144	2,426	3,091	4,651	7,668	10,416	5,337	1,615	41,527
Missouri	8,647	9,193	10,358	11,292	9,253	7,506	8,264	13,969	25,684	45,326	39,140	14,747	203,379
Nebraska	31,662	13,354	15,421	20,488	34,574	17,900	13,022	26,423	60,083	109,141	71,519	33,656	447,243
Ohio	1,392	2,202	2,634	3,526	3,909	2,808	5,249	11,503	14,312	20,762	10,178	4,141	82,616
Oklahoma	8,428	6,601	9,948	25,863	12,557	8,404	5,299	8,993	12,389	23,593	23,195	9,843	155,113
Pennsylvania	2,088	2,002	2,102	2,379	2,669	3,207	4,109	4,345	5,140	6,487	4,950	4,063	43,541
South Dakota	3,146	2,024	3,380	3,616	4,755	3,541	284	6,090	10,196	19,428	11,862	6,945	75,267
Texas	8,937	7,057	8,535	13,148	8,693	10,128	10,016	9,570	16,966	24,617	23,664	13,682	155,013
Wisconsin	512	349	1,281	1,850	3,023	1,122	1,001	1,477	2,102	3,800	2,057	1,244	19,818
All other	7,355	7,554	6,701	11,367	20,482	13,647	13,447	9,077	12,737	30,823	25,115	13,896	172,207
Total	162,488	109,488	133,813	[1] 208,930	190,212	135,223	141,358	230,304	386,640	690,740	463,678	227,322	3,080,196

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 6 head shipped to Alaska.

TABLE 355.—*Feeder cattle, inspected: Shipments from public stockyards, 1920–1928*

Origin and destination	1920	1921	1922	1923	1924	1925	1926	1927	1928
Market origin:	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Chicago, Ill	339	331	332	275	246	230	245	167	171
Denver, Colo	350	237	344	347	346	281	288	328	403
East St. Louis, Ill	119	129	184	170	136	113	110	97	90
Fort Worth, Tex	309	153	209	162	160	196	233	273	285
Indianapolis, Ind	64	51	44	59	49	55	44	29	31
Kansas City, Kans	751	708	1,106	1,138	901	825	706	671	684
Louisville, Ky	28	37	42	33	21	27	19	34	24
Oklahoma City, Okla	120	94	91	77	56	78	69	89	80
Omaha, Nebr	475	396	566	545	476	390	379	329	355
Sioux City, Iowa	219	214	289	281	249	247	300	237	274
South St. Joseph, Mo	62	64	104	97	85	71	56	51	60
South St. Paul, Minn	159	144	306	223	173	208	291	203	198
Wichita, Kans	109	128	198	198	193	200	152	198	205
All other inspected	181	141	224	194	185	177	195	268	344
Total	3,285	2,827	4,039	3,799	3,276	3,098	3,087	2,974	3,204
State destination:									
Colorado	141	96	126	159	166	131	169	180	210
Illinois	294	330	546	500	439	437	435	290	310
Indiana	133	136	151	149	137	150	167	136	113
Iowa	471	468	841	742	570	487	577	431	499
Kansas	440	336	511	511	473	468	378	423	478
Kentucky	44	60	54	49	25	41	43	86	59
Michigan	55	53	50	46	47	49	41	36	41
Minnesota	35	25	18	22	31	36	32	25	29
Missouri	310	312	395	418	285	277	255	267	229
Nebraska	360	378	659	648	565	427	374	386	474
Ohio	102	115	123	113	90	97	102	93	70
Oklahoma	186	152	151	115	108	168	159	170	143
Pennsylvania	36	39	41	27	24	31	30	31	70
South Dakota	54	48	63	70	57	38	32	50	64
Texas	307	105	111	95	128	116	151	160	196
Wisconsin	42	35	30	23	23	26	29	12	12
All other	275	139	169	112	108	119	113	198	207
Total [1]	3,285	2,827	4,039	3,799	3,276	3,098	3,087	2,974	3,204

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 2 head shipped to Alaska in 1925 and 10 head in 1926.

TABLE 356.—*Cattle, beef: Estimated average price per 100 pounds received by producers in the United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	4.71	4.64	4.87	5.31	5.23	5.20	4.84	4.64	4.65	4.64	4.48	4.45	4.78
1911	4.58	4.57	4.66	4.67	4.59	4.43	4.28	4.39	4.43	4.32	4.36	4.37	4.46
1912	4.46	4.61	4.75	5.15	5.36	5.23	5.17	5.37	5.35	5.36	5.22	5.33	5.14
1913	5.40	5.55	5.88	6.08	6.01	6.02	5.98	5.91	5.92	6.05	5.99	5.96	5.91
1914	6.04	6.16	6.28	6.29	6.33	6.32	6.38	6.47	6.38	6.23	6.02	6.01	6.24
1915	5.99	5.93	5.92	5.96	6.13	6.20	6.07	6.18	6.06	6.04	5.85	5.75	6.01
1916	5.85	5.99	6.37	6.66	6.73	6.91	6.78	6.51	6.55	6.37	6.44	6.56	6.48
1917	6.86	7.36	7.91	8.57	8.70	8.65	8.30	8.17	8.40	8.35	8.21	8.24	8.17
1918	8.33	8.55	8.85	9.73	10.38	10.40	10.07	9.71	9.63	9.33	9.14	9.28	9.46
1919	9.65	10.02	10.34	10.81	10.84	10.20	9.96	9.82	9.02	8.65	8.65	8.63	9.61
1920	8.99	8.98	9.08	9.20	8.97	9.32	8.93	8.56	8.29	7.77	7.15	6.36	8.38
1921	6.32	6.02	6.36	6.08	5.98	5.65	5.40	5.39	4.98	4.81	4.69	4.62	5.44
1922	4.75	5.07	5.46	5.53	5.70	5.84	5.76	5.51	5.44	5.48	5.29	5.28	5.43
1923	5.51	5.55	5.62	5.78	5.77	5.82	5.72	5.60	5.70	5.48	5.23	5.26	5.57
1924	5.38	5.47	5.63	5.82	5.94	5.79	5.65	5.67	5.53	5.52	5.43	5.35	5.59
1925	5.63	5.69	6.18	6.55	6.48	6.46	6.55	6.58	6.27	6.29	6.14	6.18	6.26
1926	6.31	6.42	6.65	6.66	6.57	6.56	6.46	6.29	6.48	6.43	6.32	6.42	6.46
1927	6.45	6.60	6.82	7.13	7.17	7.08	7.13	7.21	7.42	7.55	8.00	8.32	7.54
1928	8.48	8.72	8.81	8.92	9.09	9.10	9.19	9.51	9.96	9.63	9.27	8.94	9.18
1929	8.97	8.89	9.16	9.53	9.72	9.72	9.80	9.62	9.22	8.92	8.63	8.48	9.20

Bureau of Agricultural Economics. Based on reports of special price reporters. Monthly prices weighted by number of cattle Jan. 1, by States; yearly price obtained by weighting monthly prices by receipts at principal markets.

Table 357.—*Calves, veal: Estimated average price per 100 pounds received by producers in the United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	6.41	6.28	6.59	6.54	6.30	6.57	6.37	6.29	6.43	6.41	6.39	6.38	6.42
1911	6.50	6.38	6.48	5.96	5.68	5.72	5.74	5.93	6.11	6.15	6.10	5.98	6.04
1912	6.06	6.07	6.11	6.22	6.23	6.33	6.33	6.62	6.83	6.90	6.77	6.88	6.45
1913	7.06	7.23	7.49	7.38	7.17	7.53	7.46	7.53	7.73	7.72	7.70	7.74	7.48
1914	7.89	7.90	7.92	7.68	7.59	7.69	7.80	8.08	8.06	7.97	7.78	7.61	7.83
1915	7.66	7.62	7.50	7.31	7.35	7.53	7.87	7.75	7.80	7.91	7.69	7.61	7.63
1916	7.67	7.87	8.11	8.00	8.08	8.39	8.54	8.59	8.77	8.59	8.60	8.79	8.35
1917	9.15	9.88	9.94	10.49	10.48	10.60	10.77	10.56	11.08	11.10	10.66	10.98	10.51
1918	11.16	11.17	11.33	11.71	11.62	11.88	12.33	12.22	12.57	12.35	11.94	12.31	11.91
1919	12.39	12.18	12.65	12.78	12.11	12.40	13.38	13.43	13.39	12.87	12.65	12.67	12.76
1920	12.89	13.12	12.98	12.72	11.69	11.68	11.44	11.64	11.88	11.64	10.77	9.27	11.80
1921	9.31	9.08	9.05	7.73	7.55	7.43	7.37	7.31	7.67	7.61	7.20	7.14	7.81
1922	7.23	7.84	7.85	7.26	7.28	7.67	7.49	7.67	8.10	8.17	7.92	7.78	7.68
1923	8.05	8.37	8.20	7.78	7.69	7.66	8.00	8.00	8.34	8.37	7.85	7.75	7.99
1924	8.36	8.51	8.43	8.33	8.14	7.91	7.88	7.94	8.09	8.22	7.89	7.84	8.12
1925	8.50	8.87	9.21	8.80	8.35	8.18	8.65	8.80	9.07	9.52	9.16	9.17	8.85
1926	9.44	9.86	9.75	9.45	8.92	9.65	9.47	9.54	10.06	10.29	9.54	9.44	9.61
1927	9.75	10.10	10.10	9.90	9.37	9.46	9.82	10.37	10.78	11.04	10.67	10.71	10.16
1928	10.88	11.30	11.34	11.18	11.18	11.56	11.87	12.32	13.05	12.62	11.99	11.82	11.79
1929	12.20	12.17	12.51	12.10	12.11	12.06	12.40	12.39	12.52	12.16	11.80	11.69	12.18

Bureau of Agricultural Economics. Based on reports of special price reporters. Monthly prices weighed by number of milk cows Jan. 1, by States; yearly price obtained by weighting monthly prices by receipts at principal markets.

Table 358.—*Cattle, choice steers for chilled beef: Average price per 100 pounds, by months, Buenos Aires, 1909–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1909	3.00	3.03	3.07	3.00	3.07	3.20	3.41	3.64	3.95	4.38	4.21	3.81	3.48
1910	3.34	3.30	3.61	3.61	3.54	3.64	3.71	3.98	4.28	4.62	4.32	3.47	3.78
1911	3.57	3.61	3.84	3.81	3.84	3.95	4.15	4.18	4.21	4.18	4.01	3.47	3.90
1912	3.58	3.78	3.62	3.73	3.72	3.71	3.71	4.05	4.15	4.15	4.15	4.08	3.87
1913	4.22	4.19	4.44	4.93	5.26	5.02	5.10	5.12	5.12	5.22	5.35	5.18	4.93
1914	4.96	5.27	5.47	5.69	5.47	5.67	5.73	6.01	6.21	6.29	5.86	5.80	5.70
1915	5.72	5.61	5.56	5.65	5.44	5.54	5.97	6.71	7.45	7.52	7.11	6.59	6.24
1916	6.93	7.15	6.91	6.93	6.84	6.31	6.42	6.54	6.84	7.16	6.95	6.74	6.81
1917	6.69	6.56	6.49	6.31	6.46	6.34	6.37	6.40	6.16	6.54	6.03	5.55	6.32
1918	5.39	5.83	5.88	6.06	6.04	5.98	6.21	7.49	8.41	8.49	8.03	8.06	6.82
1919	7.96	7.75	7.74	7.85	8.03	7.21	8.60	8.92	9.63	9.20	8.25	7.72	8.24
1920	7.96	7.97	8.20	8.06	7.88	7.56	7.47	7.42	7.15	7.27	6.28	5.98	7.43
1921	5.93	5.95	5.71	5.41	4.40	4.10	3.69	4.12	4.74	4.96	4.90	4.39	4.86
1922	4.68	4.53	3.97	3.30	3.31	3.90	4.41	4.50	4.24	3.84	3.30	3.25	3.94
1923	3.08	3.25	3.82	4.06	3.83	3.56	3.62	3.36	3.82	4.10	3.48	3.23	3.60
1924	3.19	3.40	3.61	3.50	3.56	3.76	4.51	4.93	5.15	5.95	5.62	5.42	4.38
1925	5.54	5.54	6.20	6.20	6.51	6.48	6.54	6.72	6.91	6.25	5.66	5.32	6.16
1926	5.40	5.42	5.27	5.39	5.52	5.24	5.58	5.70	5.45	4.63	4.06	4.21	5.16
1927	4.21	4.73	4.63	5.03	4.81	5.15	5.95	6.55	6.84	7.13	6.34	5.81	5.52
1928	6.11	5.86	6.21	6.33	6.65	6.99	6.79	6.60	6.67	6.38	5.61	5.32	6.29
1929	5.83	5.89	5.87	5.76	5.93	5.98	6.07	6.07	6.06	6.68	6.19	------	------

Bureau of Agricultural Economics. Calculated from quotations in the Review of the River Plate, Prices prior to May, 1924, originally quoted on basis of price per head supplemented from 1916 by price per pound of dressed carcass weight. Calculations assume average dressed weight of 730 pounds or live weight of 1,259 pounds. Live-weight quotations per pound from May, 1924. Converted at average monthly rate of exchange as given in Federal Reserve Bulletins.

Table 359.—*Cattle and calves: Monthly average price per 100 pounds, Chicago, 1900–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
						BEEF STEERS[1]							
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1900	5.20	4.85	4.85	4.95	5.10	5.20	5.25	5.40	5.35	5.25	5.15	5.00	5.15
1901	4.85	4.80	4.95	5.15	5.30	5.55	5.10	5.10	5.50	5.45	5.50	5.65	5.25
1902	5.70	5.55	6.05	6.45	6.60	6.95	7.10	7.05	6.65	6.20	5.20	4.80	6.20
1903	4.80	4.60	4.75	4.90	4.80	4.90	4.95	5.00	4.95	4.70	4.45	4.55	4.80
1904	4.65	4.50	4.60	4.65	4.85	5.60	5.40	5.10	5.10	5.20	4.95	4.40	4.95
1905	4.65	4.75	5.00	5.75	5.45	5.25	4.95	5.00	5.05	4.80	4.65	4.75	5.05
1906	5.00	5.05	5.15	5.05	5.20	5.20	5.40	5.45	5.50	5.60	5.60	5.50	5.30
1907	5.60	5.55	5.55	5.65	5.65	6.20	6.40	6.25	6.10	6.10	5.40	5.10	5.80
1908	5.30	5.40	6.00	6.50	6.60	6.90	6.45	6.00	5.95	5.70	5.90	6.00	6.10
1909	6.00	5.85	6.10	6.10	6.45	6.45	6.45	6.70	6.75	6.60	6.45	6.20	6.35
1910	6.20	6.35	7.35	7.55	7.50	7.50	7.10	6.85	6.80	6.60	6.20	6.00	6.80
1911	6.15	6.15	6.20	6.10	5.95	6.05	6.30	6.95	6.80	6.75	6.70	6.65	6.40
1912	6.85	6.60	7.20	7.65	7.95	8.00	7.90	8.50	8.15	7.90	8.10	7.85	7.75
1913	7.80	8.25	8.30	8.15	8.00	8.15	8.25	8.30	8.50	8.40	8.25	8.20	8.25
1914	8.45	8.30	8.35	8.50	8.40	8.60	8.80	9.10	9.35	9.05	8.60	8.35	8.65
1915	8.05	7.50	7.65	7.70	8.35	8.80	9.20	9.05	8.95	8.80	8.70	8.45	8.40
1916	8.35	8.35	8.75	9.10	9.50	9.85	9.25	9.45	9.40	9.75	10.15	10.00	9.50
1917	10.15	10.50	11.25	11.75	11.90	12.15	12.35	12.70	13.10	11.70	11.10	11.40	11.60
1918	12.10	12.00	12.60	14.70	15.40	15.85	16.05	15.75	16.00	14.80	15.05	14.90	14.65
1919	15.80	15.95	16.05	15.85	15.00	13.55	15.60	16.45	15.50	16.15	15.10	14.35	15.50
1920	13.95	13.05	13.10	12.30	12.25	14.95	15.00	14.85	15.05	14.20	12.00	10.10	13.30
1921	8.70	8.20	9.05	8.15	8.25	8.00	8.10	8.50	8.00	8.10	7.40	7.00	8.20
1922	7.23	7.62	7.87	7.90	8.21	8.76	9.42	9.52	9.84	10.23	9.16	8.76	8.65
1923	8.88	8.62	8.70	8.81	9.28	9.74	9.71	10.36	10.18	9.94	9.46	8.96	9.40
1924	8.99	8.81	9.17	9.52	9.59	9.28	9.31	9.53	9.52	9.57	8.90	8.71	9.24
1925	8.97	9.15	9.93	9.99	9.90	10.34	11.28	11.10	11.04	10.80	10.16	9.72	10.16
1926	9.48	9.42	9.42	9.11	9.07	9.51	9.44	9.30	10.00	10.00	9.48	9.43	9.47
1927	9.70	9.81	10.20	10.51	10.68	11.12	11.78	12.02	12.63	13.43	13.57	13.08	11.36
1928	13.67	13.15	12.83	13.01	13.19	13.86	15.11	15.30	15.91	14.61	13.84	12.86	13.91
1929	12.51	11.92	12.68	13.52	13.67	14.10	14.59	14.22	13.92	13.81	13.00	12.74	13.43
						VEAL CALVES							
1901	5.85	5.95	5.75	5.15	5.25	6.00	5.75	5.25	5.85	5.90	5.60	5.00	5.65
1902	6.30	6.75	6.00	5.50	5.75	5.75	6.50	6.75	7.00	6.80	6.60	6.60	6.35
1903	7.10	7.15	6.50	5.75	5.60	6.20	5.65	6.40	6.65	6.40	5.75	4.95	6.20
1904	5.85	6.35	5.65	4.60	4.60	4.90	5.75	5.60	5.90	6.10	6.00	6.00	5.60
1905	6.15	6.50	5.70	5.10	5.25	5.85	5.75	5.90	6.00	6.00	6.00	6.60	5.75
1906	7.00	6.40	6.25	5.60	5.65	5.80	5.60	6.00	6.75	6.50	6.25	7.00	6.25
1907	7.00	6.50	6.60	6.00	6.35	6.15	6.40	6.35	6.50	6.00	6.25	6.00	6.40
1908	6.75	6.60	6.20	5.50	5.60	5.80	6.00	6.75	7.60	7.20	6.50	7.40	6.50
1909	7.60	6.85	7.00	6.30	6.35	6.50	7.00	7.50	7.60	8.10	7.40	8.25	7.10
1910	8.60	8.65	9.00	7.85	7.35	7.85	7.60	7.75	8.50	8.65	8.75	8.50	8.10
1911	8.75	8.40	7.40	6.60	7.25	7.60	7.40	8.00	8.75	8.60	8.35	7.85	7.60
1912	8.75	7.50	8.00	7.40	7.75	8.00	8.75	9.75	11.25	10.00	9.85	10.25	8.75
1913	9.75	9.85	10.50	8.50	9.25	9.75	10.40	11.50	11.25	10.50	10.35	10.75	10.10
1914	11.00	10.75	9.00	8.85	9.50	9.40	10.60	11.00	11.40	10.65	10.35	8.65	9.90
1915	9.85	10.35	10.00	8.40	9.15	9.60	10.25	11.50	11.25	10.85	10.15	9.65	10.15
1916	10.15	10.65	9.65	8.75	10.40	11.25	11.40	12.00	12.40	11.50	11.85	11.75	10.85
1917	13.40	12.65	13.40	12.50	13.25	13.40	13.00	15.15	15.00	14.85	13.50	15.25	13.75
1918	15.35	14.15	15.25	14.50	13.50	15.55	16.70	17.25	18.60	17.10	16.80	16.50	15.75
1919	15.62	15.75	15.01	14.31	14.66	16.37	17.88	19.62	20.52	18.05	17.60	16.56	16.83
1920	17.74	16.73	16.73	14.22	12.12	13.68	13.98	15.06	16.39	14.18	13.74	10.39	14.58
1921	11.49	11.02	10.33	8.12	8.66	8.72	9.73	9.39	10.71	8.68	7.70	7.81	9.36
1922	8.36	9.16	8.26	6.97	8.46	8.89	8.90	10.88	11.92	9.65	8.91	9.42	9.15
1923	10.08	10.63	9.32	8.68	9.51	9.31	10.14	10.36	10.57	9.82	8.15	9.31	9.66
1924	11.08	10.54	9.75	9.03	9.30	8.74	9.48	10.63	10.72	10.10	9.02	9.97	9.86
1925	10.72	11.94	11.24	9.49	9.42	9.56	10.91	11.94	12.18	11.19	10.60	11.30	10.87
1926	12.18	12.43	12.06	9.91	11.04	11.09	11.38	12.46	12.59	11.80	11.09	11.31	11.61
1927	12.20	12.40	11.54	10.90	11.07	11.68	13.32	14.75	15.94	14.42	13.48	13.09	12.90
1928	13.70	15.04	13.75	13.02	13.95	13.24	14.84	16.68	17.36	14.94	14.22	13.94	14.56
1929	15.83	14.74	15.50	14.43	13.39	14.22	15.30	15.81	16.64	13.76	13.70	13.82	14.76

Bureau of Agricultural Economics. Prices of beef steers prior to January, 1922, compiled from the Chicago Drovers Journal Yearbook. Subsequent figures are the weighted average price of all grades of beef steers sold out of first hands at Chicago. Veal calf prices prior to January, 1919, compiled from Chicago Drovers Journal Yearbook, and later from data of the livestock and meat reporting service of the bureau.

[1] Western steers not included.

TABLE 360.—*Cattle and calves: Average price per 100 pounds at Chicago and Kansas City, by months, July, 1927–December, 1929*

CHICAGO

Month	Slaughter cattle										Vealers (milk-fed)		Feeder steers, 850 pounds up	
	Beef steers						Heifers, 850 pounds up		Cows					
	1,300 to 1,500 pounds, choice	1,100 to 1,300 pounds, choice	950–1,100 pounds		800 pounds up									
			Choice	Good	Medium	Common	Choice	Good	Good	Common and medium	Good and choice	Medium	Good and choice	Common and medium
1927	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
July	14.06	13.61	13.00	11.63	10.19	8.18	11.00	9.66	7.68	6.17	13.32	12.01	9.00	7.75
August	14.17	14.04	13.75	12.18	10.08	7.84	11.38	9.87	7.80	6.05	14.75	13.15	9.15	7.81
September	15.31	15.24	15.04	13.11	10.59	7.80	12.16	10.64	8.15	6.28	15.94	14.01	9.68	8.05
October	16.62	16.54	16.31	14 12	11.09	8.03	12.84	11.29	8.14	6.52	14.42	13.26	10.08	8.24
November	17.88	17.73	17.60	15.06	11.67	8.40	12.85	11.41	8.48	6.61	13.48	12.12	10.73	8.99
December	17.75	17.51	17.16	14.96	12.00	9.17	12.53	11.46	9.31	7.18	13.09	11.68	11.13	9.30
Average 6 months	15.96	15.78	15.48	13.51	10.94	8.24	12.13	10.72	8.26	6.47	14.17	12.70	9.96	8.36
1928														
January	18.02	17.68	17.24	15.18	12.81	10.12	12.66	11.62	9.79	7.59	13.70	11.86	11.42	9.41
February	16.78	16.42	16.01	14.47	12.32	9.99	12.30	11.46	9.41	7.63	15.04	13.24	11.76	9.89
March	15.09	14.86	14.66	13.66	12.27	9.96	12.13	11.12	9.40	7.46	13.75	11.81	11.77	9.99
April	14.62	14.56	14.32	13.53	12.24	10.06	12.36	11.58	9.60	8.24	13.02	10.79	12.04	10.19
May	14.36	14.37	14.40	13.53	12.22	10.49	12.78	11.89	10.06	8.31	13.95	11.69	12.17	10.42
June	14.50	14.63	14.70	13.96	12.72	10.98	13.30	12.17	10.19	8.42	13.24	11.26	12.38	10.62
July	15.86	15.90	15.98	15.03	13.41	10.78	14.18	13.19	10.52	8.37	14.84	12.88	12.51	10.62
August	16.27	16.39	16.48	15.34	13.24	10.52	14.68	13.67	10.67	8.45	16.68	14.27	12.74	10.62
September	17.76	17.78	17.75	16.09	13.77	10.96	15.26	14.18	10.70	8.47	17.36	15.43	13.08	10.72
October	17.18	17.25	17.36	15.58	13.01	10.38	14.35	13.52	10.08	8.05	14.94	13.47	12.16	10.06
November	16.97	17.02	17.17	15.11	12.64	10.22	13.54	12.44	9.71	7.82	14.22	12.51	11.61	10.02
December	16.11	16.15	16.36	14.34	12.16	10.12	12.54	11.62	9.06	7.44	13.94	12.10	11.41	9.86
Average	16.13	16.08	16.04	14.65	12.73	10.38	13.34	12.37	9.93	8.02	14.56	12.61	12.09	10.20
1929														
January	15.39	15.58	15.89	14.31	12.32	10.36	12.16	11.35	9.19	7.58	15.83	13.71	11.34	9.80
February	14.18	14.31	14.37	13.20	11.58	9.99	11.61	10.91	9.02	7.68	14.74	12.89	10.92	9.51
March	13.89	14.08	14.30	13.42	12.41	10.63	12.31	11.55	9.49	8.03	15.50	13.08	12.02	10.36
April	14.47	14.49	14.55	13.87	12.86	11.10	12.96	12.24	9.92	8.67	14.43	11.74	12.59	10.90
May	14.55	14.62	14.72	13.94	12.96	11.64	13.39	12.65	10.47	8.83	13.39	10.64	12.91	11.07
June	15.17	15.18	15.16	14.35	13.36	11.96	13.51	12.68	10.20	8.64	14.22	11.62	12.77	11.00
July	16.05	16.02	15.85	14.41	12.76	10.91	13.56	12.57	9.81	8.09	15.30	13.21	12.76	10.78
August	16.40	16.42	16.43	14.57	12.17	9.86	13.56	12.46	9.80	7.80	15.81	13.31	11.95	9.86
September	16.02	16.08	16.13	14.34	11.98	9.79	13.42	12.28	9.74	7.76	16.64	13.90	11.21	9.32
October	15.75	15.82	15.92	14.24	12.10	9.90	12.84	11.88	8.96	7.29	13.76	11.90	10.90	9.12
November	14.38	14.96	15.27	13.81	11.73	9.70	12.84	11.72	8.46	6.81	13.70	11.56	10.28	8.73
December	14.30	15.00	15.47	13.89	11.80	9.52	12.74	11.24	8.58	6.92	13.82	11.27	10.47	9.12
Average	15.05	15.21	15.34	14.03	12.34	10.45	12.91	11.96	9.47	7.84	14.76	12.40	11.68	9.96

TABLE 360.—*Cattle and calves: Average price per 100 pounds at Chicago and Kansas City, by months, July, 1927–December, 1929*—Continued

KANSAS CITY

Month	Slaughter cattle										Vealers (milk-fed)		Feeder steers, 850 pounds up	
	Beef steers						Heifers, 850 pounds up		Cows					
	1,300 to 1,500 pounds, choice	1,100 to 1,300 pounds, choice	950–1,100 pounds		800 pounds up									
			Choice	Good	Medium	Common	Choice	Good	Good	Common and medium	Good and choice	Medium	Good and choice	Common and medium
1927	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
July	13.40	12.66	12.21	10.91	9.32	7.28	10.47	9.43	7.23	5.73	11.14	8.97	9.25	7.38
August	13.42	13.04	13.04	11.35	9.36	7.25	11.18	9.93	7.25	5.76	12.04	9.45	9.29	7.39
September	14.41	14.36	14.24	12.23	9.48	7.16	11.63	10.22	7.34	5.96	11.76	8.85	9.28	7.17
October	15.50	15.48	15.47	13.26	9.98	7.21	12.15	10.59	7.62	6.30	12.48	9.51	9.52	7.18
November	16.90	16.83	16.68	14.12	10.76	7.72	12.43	10.84	7.87	6.48	11.84	9.12	10.17	7.67
December	16.53	16.50	16.36	13.95	10.96	7.91	12.12	10.65	8.21	6.65	10.45	8.19	10.47	8.08
Average 6 months	15.03	14.81	14.67	12.64	9.98	7.42	11.66	10.28	7.59	6.15	11.62	9.02	9.66	7.48
1928														
January	17.37	17.16	16.83	14.74	11.80	8.70	12.24	10.91	9.20	7.41	11.00	9.02	11.27	8.94
February	16.05	15.61	15.34	13.68	11.63	8.86	11.75	10.61	9.09	7.37	12.48	9.69	11.49	9.35
March	14.30	14.06	13.92	12.79	11.35	8.86	11.58	10.55	9.12	7.38	11.34	8.45	11.59	9.37
April	14.00	13.84	13.67	12.82	11.62	9.58	11.72	10.84	9.26	7.68	10.99	8.01	11.61	9.42
May	13.70	13.69	13.77	12.85	11.72	9.97	12.15	11.37	9.54	8.12	12.00	9.00	11.74	9.69
June	13.86	13.96	14.28	13.28	12.02	10.13	12.66	11.70	9.48	8.18	11.69	9.05	11.91	9.91
July	15.35	15.39	15.48	14.47	12.54	10.00	13.67	12.66	9.73	8.02	12.12	9.40	12.38	10.06
August	15.10	15.38	15.75	14.50	12.35	9.66	13.75	12.69	9.64	7.90	12.84	9.75	12.58	10.12
September	16.56	16.69	16.82	14.85	12.33	9.85	14.05	12.94	9.72	8.02	14.12	10.52	12.62	10.07
October	15.99	16.08	16.29	14.11	11.54	9.23	13.69	12.56	9.18	7.66	12.20	9.19	11.87	9.64
November	15.66	15.67	15.92	13.70	11.28	9.02	13.28	12.04	9.25	7.59	12.19	9.58	11.26	9.34
December	15.10	15.22	15.58	13.32	10.88	8.98	12.41	11.34	8.82	7.30	11.85	9.36	11.05	9.17
Average	15.25	15.23	15.30	13.76	11.76	9.40	12.75	11.68	9.34	7.72	12.07	9.25	11.78	9.59
1929														
January	14.34	14.47	14.90	12.89	11.06	9.31	11.58	10.69	8.78	7.36	13.75	10.73	11.46	9.47
February	13.08	13.22	13.58	12.15	10.73	9.13	10.88	10.03	8.50	7.42	12.98	10.28	11.10	9.32
March	13.12	13.37	13.84	12.81	11.70	10.22	11.65	10.71	9.18	7.90	14.40	11.68	12.14	10.34
April	13.68	13.86	14.08	13.30	12.25	10.56	12.34	11.35	9.80	8.46	13.36	10.45	12.42	10.67
May	13.81	13.92	14.18	13.32	12.26	10.57	12.73	11.89	10.10	8.71	12.07	9.62	12.60	10.70
June	14.52	14.55	14.54	13.47	12.41	10.54	12.87	12.04	9.92	8.33	11.71	9.30	12.60	10.55
July	15.38	15.30	15.27	13.83	12.16	9.82	13.13	11.99	9.28	7.56	12.40	9.80	12.37	10.16
August	15.50	15.48	15.46	13.38	10.84	8.46	12.95	11.63	8.79	7.15	12.16	9.32	11.44	9.18
September	15.03	15.03	15.13	13.15	10.50	8.07	12.88	11.56	8.62	6.98	13.12	10.22	10.74	8.62
October	14.57	14.59	15.02	13.18	10.52	8.37	12.54	11.43	8.31	6.90	11.58	8.98	10.39	8.54
November	13.53	13.75	14.28	12.74	10.27	8.35	12.48	11.26	8.09	6.54	11.50	9.00	10.09	8.35
December	13.30	13.67	14.29	13.02	10.82	9.00	12.20	11.08	8.01	6.49	11.40	8.70	10.50	8.67
Average	14.16	14.27	14.55	13.10	11.29	9.37	12.35	11.30	8.95	7.48	12.54	9.84	11.49	9.55

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 991–994.

TABLE 361.—*Cattle and calves: Monthly slaughter*[1] *under Federal inspection, 1907–1929*

CATTLE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	718	570	555	635	620	588	641	668	696	801	596	546	7, 633
1908	643	527	520	463	491	525	563	640	768	821	681	637	7, 279
1909	587	490	551	508	536	544	608	652	782	892	799	765	7, 714
1910	632	527	599	533	551	621	615	679	796	831	780	644	7, 808
1911	626	536	562	499	599	614	591	720	692	828	746	605	7, 619
1912	675	515	564	522	563	511	508	632	644	808	691	620	7, 253
1913	622	490	484	555	647	556	593	582	656	701	602	590	6, 978
1914	585	499	476	474	474	490	505	518	650	744	658	682	6, 757
1915	573	466	552	507	534	574	596	590	641	736	702	681	7, 153
1916	623	550	597	476	564	648	562	743	791	941	972	844	8, 310
1917	823	663	647	654	815	844	784	866	957	1, 196	1, 099	1, 003	10, 350
1918	895	785	828	915	782	830	1, 020	987	1, 143	1, 251	1, 233	1, 160	11, 829
1919	1, 119	701	640	622	721	644	855	859	855	1, 073	1, 040	960	10, 091
1920	832	631	683	638	626	657	661	686	825	843	859	667	8, 609
1921	690	526	621	591	570	640	579	680	689	750	686	586	7, 608
1922	642	569	674	590	702	724	697	761	796	884	859	779	8, 678
1923	745	634	688	697	762	727	725	821	810	953	846	756	9, 163
1924	812	669	665	689	773	670	764	786	870	1, 016	952	926	9, 593
1925	855	656	736	731	749	732	862	811	866	1, 067	861	927	9, 853
1926	819	695	786	766	788	852	864	811	971	996	947	887	10, 180
1927	786	700	761	742	785	799	743	838	828	895	881	761	9, 520
1928	711	666	665	623	723	706	662	717	764	801	762	667	8, 467
1929	736	569	632	662	676	636	706	726	753	839	731	658	8, 324

CALVES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1907	128	99	122	205	224	204	221	206	198	187	126	104	2, 024
1908	117	88	137	197	205	211	192	185	187	180	143	116	1, 958
1909	135	95	149	200	228	236	213	196	205	205	171	155	2, 189
1910	132	117	188	222	252	238	198	206	197	188	168	132	2, 238
1911	135	121	180	218	243	232	198	207	184	180	155	128	2, 184
1912	152	126	180	245	258	229	201	192	190	193	163	149	2, 278
1913	139	118	142	212	205	195	182	149	159	157	124	122	1, 902
1914	122	100	145	186	183	187	153	129	130	135	107	119	1, 697
1915	109	96	156	199	205	197	162	141	139	148	141	125	1, 819
1916	129	143	189	233	267	228	178	207	186	204	217	185	2, 367
1917	203	182	212	286	345	277	277	255	272	339	281	216	3, 143
1918	210	193	260	351	357	312	356	274	317	306	272	249	3, 456
1919	295	210	295	383	391	327	400	319	318	375	344	312	3, 969
1920	305	283	390	382	369	431	343	332	348	315	316	245	4, 058
1921	282	254	360	366	367	370	324	304	321	309	292	259	3, 808
1922	288	279	391	365	401	389	329	345	353	383	348	309	4, 182
1923	352	297	368	400	467	388	379	403	338	416	370	324	4, 500
1924	373	346	377	466	470	408	421	374	419	473	392	416	4, 935
1925	394	378	466	496	481	473	473	439	422	486	398	445	5, 353
1926	410	378	464	461	455	480	425	379	408	446	435	410	5, 153
1927	397	377	457	454	462	430	355	389	357	413	411	376	4, 877
1928	383	374	407	438	473	398	362	369	352	405	378	341	4, 680
1929	369	311	409	460	427	344	363	338	365	398	358	346	4, 489

Bureau of Animal Industry.

[1] The figures include rejected carcasses.

TABLE 362.—*Cattle and calves, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, 1923–1929*

CATTLE

Year and month	Source of supply		Sex classification			Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)		
	Stockyards	Other	Bulls and stags	Cows and heifers	Steers				Edible fat [1]	Edible offal	Hides
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
1923	89.86	10.14	4.04	48.06	47.90	6.82	952.89	54.13	3.84	2.80	6.79
1924	90.77	9.23	4.10	49.42	46.48	6.64	949.64	53.50	3.86	2.85	6.80
1925	90.74	9.26	3.38	51.31	45.31	7.11	954.06	53.06	3.61	2.94	6.77
1926	89.80	10.20	3.39	49.73	46.88	7.32	964.06	53.77	3.89	3.05	6.79
1927	89.90	10.10	3.72	49.27	47.01	8.62	945.99	53.57	3.71	3.03	6.84
1928	89.90	10.10	3.88	50.78	45.34	10.59	947.93	53.54	3.92	3.15	6.63
1929	88.90	11.10	3.99	47.38	48.63	10.58	954.63	54.19	4.06	3.26	6.58
1929											
January	89.71	10.29	3.02	49.44	47.54	10.36	967.26	54.16	4.16	3.09	6.61
February	89.62	10.38	2.93	48.06	49.01	9.96	972.86	54.39	4.25	3.23	6.58
March	88.57	11.43	3.39	45.66	50.95	10.80	969.88	55.05	4.45	3.29	6.50
April	88.69	11.31	3.77	41.44	54.79	11.57	969.74	55.41	4.49	3.25	6.46
May	87.99	12.01	5.04	41.21	53.75	11.73	957.00	55.06	4.41	3.32	6.46
June	86.84	13.16	5.51	42.45	52.04	11.78	946.78	55.15	4.31	3.20	6.52
July	87.77	12.23	4.97	42.98	52.05	11.66	947.15	54.77	4.19	3.28	6.53
August	89.67	10.33	4.07	45.59	50.34	10.77	941.07	54.09	3.97	3.29	6.53
September	89.61	10.39	3.64	47.77	48.59	10.23	940.75	53.68	3.79	3.30	6.58
October	90.08	9.92	3.61	53.52	42.87	9.64	942.20	53.04	3.65	3.31	6.65
November	89.50	10.50	3.67	56.69	39.64	9.17	945.79	52.64	3.53	3.25	6.73
December	87.89	12.11	4.44	51.01	44.55	9.67	965.24	53.42	3.75	3.32	6.71

CALVES

Year and month	Source of supply		Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)	
	Stockyards	Other				Edible fat [1]	Edible offal
	Per cent	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*
1923	86.24	13.76	7.86	172.82	57.13	0.75	3.57
1924	87.08	12.92	7.67	176.78	57.28	.75	3.61
1925	87.18	12.82	8.66	176.03	57.51	.71	3.68
1926	85.28	14.72	9.82	176.39	58.52	.66	3.66
1927	84.18	15.82	10.58	175.94	57.31	.75	3.78
1928	85.10	14.90	12.21	175.94	56.14	.79	3.83
1929	83.45	16.55	12.48	176.31	57.25	.80	4.04
1929							
January	82.79	17.21	13.50	169.69	58.80	.76	3.89
February	83.87	16.13	13.02	166.18	58.19	1.12	4.27
March	83.55	16.45	13.73	156.19	58.01	.88	4.31
April	85.35	14.65	13.28	148.44	57.94	.88	4.26
May	84.47	15.53	12.66	159.82	57.78	.71	4.41
June	82.02	17.98	12.84	175.10	57.41	.74	4.25
July	82.90	17.10	13.01	188.47	56.42	.71	3.95
August	83.72	16.28	12.29	203.13	57.99	.77	3.77
September	84.42	15.58	12.33	204.77	55.89	.81	3.53
October	82.83	17.17	11.19	193.15	55.61	.83	3.81
November	83.01	16.99	11.02	188.18	57.20	.77	4.18
December	81.64	18.36	11.29	175.00	56.87	.73	4.25

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Unrendered.

TABLE 363.—*Cattle: Slaughter in specified countries, average pre-war, annual, 1914–1928*

Year	Argentina, including chilling, freezing, salting, and canned-meat works [1]	Uruguay, excluding farm [2]	Australia	New Zealand [3]	Canada	United States, Federal inspected
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Average pre-war [4]	1,691	914	1,572	[5] 277	1,218	9,632
1914	1,589	663	2,092	[5] 299		8,454
1915	1,641	807	1,578			8,972
1916	2,102	798	1,373	389		10,677
1917	2,496	1,056	1,345	344		13,493
1918	3,292	1,062	1,335	358		15,285
1919	2,342	1,061	1,598	417	1,891	14,060
1920	1,715	759	1,538	371	1,776	12,667
1921	1,550	717	1,649	268	2,017	11,416
1922	2,231	1,109	1,907	359	1,899	12,860
1923	3,338	1,393	2,049	423	1,850	13,663
1924	4,321	1,173	2,505	501	1,864	14,528
1925	3,871	1,233	2,434	469	1,921	15,206
1926	3,510	1,293	2,160	413	1,903	15,333
1927	3,718	1,239	2,189	470	2,003	14,396
1928	3,303	[6] 1,264			1,957	13,147

Bureau of Agricultural Economics. Compiled from official sources and cabled reports from agricultural commissioners abroad.

[1] Including municipal and private slaughterhouses, the figures were as follows in thousands—averages, pre-war, 3,272; 1921–1925, 5,961. The numbers killed in freezing and chilling plants alone were as follows in thousands—1925, 3,333; 1926, 3,060; 1927, 3,234; 1928, 2,830.

[2] Slaughtering in freezing and chilling plants alone were as follows in thousands—1925, 651; 1926, 714; 1927, 695; 1928, 697.

[3] For years ended March 31 following.

[4] Average for five years immediately preceding war if avaiable, otherwise for any year or years within that period, unless otherwise stated.

[5] Excluding farm slaughter which averaged only 7,493 for the 10 years 1917–1926.

[6] Preliminary estimate.

TABLE 364.—*Beef, frozen: Stocks in cold-storage warehouses and meat-packing establishments, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1916	126,374	132,266	124,954	118,279	90,176	73,025	55,109	58,867	58,303	66,319	92,815	158,148
1917	202,442	190,909	169,793	154,193	118,391	103,007	109,354	108,729	100,453	119,221	179,032	235,664
1918	315,572	292,114	276,114	268,015	212,725	190,084	154,638	180,962	185,144	194,469	224,312	229,668
1919	298,818	294,514	265,293	221,725	184,586	163,913	162,639	159,279	162,069	166,244	184,196	223,311
1920	261,812	252,037	223,145	196,890	170,455	130,619	95,297	77,469	67,010	58,461	68,663	89,718
1921	120,245	119,965	122,402	114,063	100,672	88,836	76,523	66,262	50,204	44,296	49,014	63,188
1922	68,495	61,522	55,785	50,772	45,341	37,548	31,593	27,727	28,210	34,611	47,929	73,027
1923	91,805	89,272	75,604	65,292	54,522	41,207	34,385	24,112	24,625	27,590	43,772	71,024
1924	82,984	79,944	76,769	68,075	52,941	41,784	37,028	29,435	29,135	28,599	45,857	76,731
1925	114,034	111,947	101,599	87,684	67,271	46,887	36,452	26,970	22,879	19,755	27,008	50,436
1926	59,850	55,705	51,498	43,528	32,372	26,649	23,997	23,509	21,311	25,267	38,079	59,603
1927	72,352	67,431	60,659	50,945	39,712	28,719	23,261	18,552	17,241	19,456	26,696	45,567
1928	54,968	50,673	44,017	37,625	28,253	20,654	17,256	18,896	17,603	22,463	41,635	60,189
1929	77,051	72,117	67,486	60,664	51,442	39,878	35,759	31,085	32,122	38,996	51,902	70,390

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

TABLE 365.—*Beef, cured and in process of cure: Stocks in cold-storage warehouses and meat-packing establishments, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1916	21, 443	20, 852	26, 959	25, 811	21, 869	17, 324	18, 915	18, 589	18, 450	21, 653	30, 013	37, 958
1917	37, 301	35, 891	37, 660	30, 601	29, 409	30, 831	35, 679	32, 401	30, 290	31, 246	32, 223	38, 325
1918	39, 243	38, 793	37, 575	34, 106	29, 217	24, 804	21, 968	28, 065	29, 981	28, 713	29, 339	32, 381
1919	36, 267	35, 810	31, 246	30, 689	27, 822	27, 089	29, 244	30, 943	35, 526	37, 328	37, 595	35, 547
1920	37, 052	36, 715	37, 002	35, 047	30, 333	26, 653	26, 355	23, 617	22, 711	19, 594	20, 352	22, 448
1921	22, 567	22, 926	24, 006	24, 282	21, 516	20, 716	19, 697	17, 829	17, 130	15. 526	14, 472	17, 144
1922	16, 313	16, 774	17, 997	18, 744	19, 166	19, 304	19, 113	19, 304	20, 081	18, 961	19, 884	22, 602
1923	24, 450	24, 841	24, 987	25, 210	24, 013	23, 816	22, 835	21, 781	21, 416	20, 597	19, 649	22, 142
1924	22, 593	22, 711	23, 238	25, 199	25, 482	24, 285	22, 390	20, 377	19, 771	18, 939	21, 387	23, 508
1925	28, 930	28, 758	29, 210	28, 634	28, 952	27, 731	25, 102	22, 704	22, 335	20, 964	20, 473	23, 128
1926	25, 146	24, 833	26, 192	27, 253	27, 606	25, 930	24, 691	22, 539	20, 386	20, 983	23, 119	26, 374
1927	28, 521	27, 823	27, 361	26, 214	23, 216	21, 694	20, 495	17, 170	16, 205	16, 422	17, 220	19, 778
1928	21, 979	20, 978	19, 732	19, 631	17, 941	16, 558	14, 982	13, 546	13, 462	14, 760	16, 401	19, 444
1929	21, 862	21, 873	21, 285	20, 943	19, 272	17, 437	16, 296	14, 845	15, 892	17, 438	20, 157	23, 054

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

NOTE.—A table similar to Table 368, 1928 Yearbook, wholesale and retail prices of beef, is omitted. Also one similar to Table 370, 1928 Yearbook, livestock and meat situation.

TABLE 366.—*Beef and beef products: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31: Average, 1911–1913		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Argentina	144	940,300	14	1,694,255	41	1,682,805		1,838,428		1,309,080
Uruguay	152	119,675	0	378,078	0	366,562	0	349,970	0	224,479
Australia [1]	[2] 437	[2] 301,882	1,930	381,233	1,567	308,042	847	206,356		169,395
Netherlands	256,296	326,176	211,157	248,405	170,463	248,114	170,819	250,270	128,389	235,390
United States	17,668	213,722	15,870	162,640	20,103	158,612	42,574	154,043	81,029	119,768
Brazil	48,989	171	11,512	135,063	7,329	20,833	2,176	76,262		18,761
New Zealand	398	80,543	577	138,672	565	97,742	588	105,300	602	85,295
Denmark	18,815	43,485	11,862	61,214	13,242	42,304	14,824	9,978	10,485	7,985
Canada	3,091	6,448	447	36,312	361	29,340	400	59,130	2,560	50,622
Poland			3,235	14,166	775	31,668	2,234	16,256	2,395	13,222
Rumania	4	2,566	437	13,492	568	16,659				
Union of South Africa	17,622	292	9,601	22,754	6,186	34,998	10,395	14,471	9,109	17,795
China	85	8,787	577	7,418	2,851	5,297	597	4,624	2,205	4,968
Hungary	[3] 12,983	[3] 3,762	833	8,508	79	6,010	35	3,247	54	2,559
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	1,252,292	27,595	1,854,596	39,689	1,899,726	34,029	1,834,663	45,381	1,729,104	3,519
Germany	212,150	942	442,993	3,090	440,883	2,138	464,089	2,563	332,852	4,887
France	41,318	62,361	249,865	37,026	186,325	24,051	173,419	30,997	69,791	45,941
Belgium	6,034	1,577	191,802	52,467	130,789	58,559	128,271	27,925	83,105	31,841
Japan	9,002	0	54,819	0	74,707	0	74,504	0	67,883	0
Cuba	37,822	0	49,444	0	39,917	0	43,897	0		
Italy	131		26,767	574	24,152	278	26,243	275	24,213	236
Norway	20,203	2,337	16,697	754	16,645	1,830	14,446	1,750	12,745	2,434
Sweden	12,912	17,285	20,720	12,904	19,430	7,645	17,253	3,697	14,228	5,660
Czechoslovakia	0	0	17,243	207	10,775	375	5,153	797	2,736	529
Spain	966	38	18,413	0	12,821	0	21,019	0		
Irish Free State	0	0	11,102	8,115	10,760	7,318	10,996	5,535	5,529	14,478
British India	7,434	773	10,239	1,289	15,716	1,230	10,525	1,114	9,279	1,390
Philippine Islands	15,837	0	10,377	0	12,052	0	11,465	0	10,321	0
Switzerland	9,052	440	5,483	749	6,568	773	5,883	902	6,530	611
British Malaya			6,103	608	6,669	630	6,913	650	7,620	674
Egypt	476		3,801	10	4,302	4	4,330	12	5,414	11
Finland	14,755	9	3,499	101	5,209	55	6,010	123	4,880	
Chile	6,636	298	8,763	190	5,168	127				
Total, 33 countries	2,023,704	2,161,464	3,270,778	3,459,983	3,146,747	3,188,028	3,104,568	3,210,056	2,623,058	2,371,528

Bureau of Agricultural Economics. Official sources.

[1] Year ending June 30. [2] Calendar year. [3] Average for Austria-Hungary.

TABLE 367.—*Cattle: Tick eradication; progress and status of the work June 30, 1929*

State	Quarantined counties		Released counties June 30, 1929			Released counties tick free on			Cattle inspected and dipped, year ended June 30, 1929	
	July 1, 1906	June 30, 1929	Tick free	With one or more infested herds	Total counties released	Nov. 1, 1926	Nov. 1, 1927	Nov. 1, 1928	Herds	Cattle
Alabama	67	1	59	7	66	49	57	59	336, 816	1, 817, 354
Arkansas	75	20	45	10	55	41	44	45	92, 267	451, 557
California	15	0	15	0	15	15	15	15	0	0
Florida	67	41	22	4	26	12	14	22	139, 394	2, 205, 414
Georgia	158	0	154	4	158	151	153	154	11, 320	225, 890
Kentucky	2	0	2	0	2	2	2	2	0	0
Louisiana	64	41	8	15	23	11	4	8	83, 349	969, 974
Mississippi	82	23	45	14	59	47	46	45	681, 473	3, 534, 582
Missouri	4	0	4	0	4	4	4	4	0	0
North Carolina	73	0	73	0	73	73	71	73	4, 670	20, 045
Oklahoma	61	0	54	7	61	55	54	54	33, 518	228, 150
South Carolina	46	0	46	0	46	40	44	46	8, 245	50, 049
Tennessee	42	0	42	0	42	42	42	42	0	0
Texas	198	72	79	47	126	72	77	79	531, 646	9, 784, 249
Virginia	31	0	29	2	31	27	26	29	1, 815	8, 158
Total	985	198	677	110	787	641	653	677	1, 924, 513	19, 295, 422

Bureau of Animal Industry. More than 15,500 vats were in use for official dipping during the year.

TABLE 368.—*Cattle and calves: Shipments and slaughter, by States, average 1924–1928, annual 1928*

State and division	Average, 1924–1928 [1]										1928 [1]									
	Shipments and local slaughter				Inshipments, stocker, feeder, breeding, and dairy		Farm slaughter				Shipments and local slaughter				Inshipments, stocker, feeder, breeding, and dairy		Farm slaughter			
	Cattle		Calves				Cattle		Calves		Cattle		Calves				Cattle		Calves	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*Pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 pounds*
Maine	28	804	58	121	1	800	9	763	24	125	24	19,380	53	6,150	1	800	8	5,600	20	2,500
New Hampshire	18	814	40	121	1	818	2	805	7	128	11	8,980	33	3,630	1	820	3	2,400	7	910
Vermont	44	810	150	122	2	818	10	804	14	125	40	32,680	139	16,150	2	1,640	9	7,200	18	2,250
Massachusetts	35	812	84	123	16	828	4	806	4	125	35	28,590	73	8,700	19	16,150	3	2,430	4	500
Rhode Island	4	818	14	124	2	823	0.6	810	-----	-----	4	3,260	12	1,475	3	2,490	-----	-----	-----	-----
Connecticut	17	811	71	125	2	837	3	809	3	125	12	9,760	69	8,575	3	2,490	1	800	1	125
New York	220	842	740	151	33	823	36	834	62	150	231	194,750	717	109,960	48	39,600	35	29,400	55	8,250
New Jersey	26	900	83	142	17	850	3	912	3	160	35	31,500	82	12,300	26	22,100	3	2,850	3	480
Pennsylvania	197	875	462	150	96	750	51	850	59	150	251	219,625	422	63,300	142	106,500	38	32,300	50	7,500
North Atlantic	589	848	1,701	143	170	785	118	833	176	143	643	548,525	1,600	230,240	245	192,590	100	82,980	158	22,515
Ohio	317	850	481	160	100	700	33	825	22	200	297	252,450	429	68,640	78	54,600	28	23,100	20	4,000
Indiana	390	900	337	150	181	725	17	812	20	250	358	322,200	322	48,300	159	115,275	15	11,625	19	4,750
Illinois	967	943	474	149	539	764	19	825	41	200	790	734,700	485	69,250	497	372,750	18	14,850	35	7,000
Michigan	245	841	386	159	51	637	28	800	55	164	237	195,525	367	56,885	46	27,600	28	22,400	67	10,720
Wisconsin	469	998	1,059	113	49	700	14	900	82	125	500	497,500	1,071	117,810	74	51,800	10	9,000	90	11,250
Minnesota	694	871	698	143	205	700	37	844	67	200	663	578,310	671	93,940	251	175,700	35	29,750	68	13,600
Iowa	1,783	968	359	155	693	715	22	811	39	228	1,476	1,398,200	328	51,900	714	492,660	25	20,750	35	10,500
Missouri	1,018	895	346	150	458	650	14	775	19	250	827	743,275	338	50,700	408	265,200	12	9,300	16	4,000
North Dakota	364	828	102	155	41	700	21	780	21	200	299	249,665	95	13,300	59	41,300	16	12,480	20	4,000
South Dakota	662	865	91	230	89	700	14	865	17	268	559	483,535	80	18,400	153	107,100	12	10,380	13	3,900
Nebraska	1,463	948	176	281	676	712	28	840	21	320	1,272	1,204,000	189	53,600	671	469,700	25	21,000	21	7,350
Kansas	1,683	914	290	260	1,034	709	29	795	15	316	1,541	1,417,720	226	58,760	1,092	764,400	25	19,250	14	4,760
North Central	10,054	920	4,799	156	4,114	710	275	821	420	201	8,819	8,077,080	4,601	701,485	4,202	2,938,085	249	203,885	418	85,830
Delaware	3	800	23	135	1	714	-----	-----	1	135	3	2,400	25	3,375	1	700	-----	-----	1	135
Maryland	34	850	116	135	14	690	4	850	3	135	30	25,500	113	15,255	13	9,100	3	2,550	3	405
Virginia	137	897	162	135	20	593	13	757	10	135	120	108,900	133	17,955	33	18,150	8	6,200	10	1,350
West Virginia	113	888	86	176	16	640	12	767	10	176	88	76,425	85	14,875	22	13,970	8	6,600	8	1,400

North Carolina	73	700	68	125	0.6	700	18	600	18	131	58	40, 600	58	7, 250	1	700	18	10, 800	19	2, 375
South Carolina	67	700	34	125	1	700	9	600	9	125	52	36, 400	23	2, 875	1	700	6	3, 600	10	1, 250
Georgia	157	496	78	150	4	500	33	500	33	175	130	65, 000	81	12, 150	6	3, 000	30	15, 000	33	5, 775
Florida	89	526	62	121	1	700	15	492	6	134	82	38, 950	69	7, 935	1	700	13	6, 175	5	625
South Atlantic	672	709	629	139	59	631	103	599	89	153	563	394, 175	587	81, 670	78	47, 020	86	50, 925	89	13, 315
Kentucky	274	827	215	159	141	700	10	750	11	220	247	203, 950	211	33, 610	107	74, 900	8	6, 000	7	1, 540
Tennessee	189	818	136	144	14	700	14	790	19	175	174	140, 880	122	16, 720	15	10, 500	8	6, 000	14	2, 450
Alabama	163	525	61	150	10	462	21	500	18	175	121	63, 525	51	7, 650	13	5, 200	23	11, 500	25	4, 375
Mississippi	229	601	90	150	2	500	13	540	11	160	237	142, 200	83	12, 450	4	2, 000	11	5, 940	12	1, 920
Arkansas	159	659	45	175	5	500	23	550	17	200	147	92, 725	54	9, 450	14	7, 000	15	8, 250	12	2, 400
Louisiana	146	600	71	140	15	390	12	500	13	170	119	71, 400	64	8, 960	30	12, 000	10	5, 000	10	1, 700
Oklahoma	670	768	185	250	291	695	15	700	20	302	699	534, 735	192	48, 000	297	200, 475	9	6, 300	21	6, 510
Texas	1, 432	790	847	280	198	743	36	650	76	280	1, 350	1, 066, 500	736	206, 080	343	250, 390	30	19, 500	72	20, 160
South Central	3, 263	749	1, 650	229	677	698	144	615	185	236	3, 094	2, 315, 915	1, 513	342, 920	823	562, 465	114	68, 490	173	41, 055
Montana	384	900	44	200	39	750	18	900	8	226	350	315, 000	40	8, 000	61	45, 750	15	12, 900	10	2, 500
Idaho	163	896	37	180	7	700	6	800	23	190	145	130, 500	36	6, 480	8	5, 600	6	4, 800	22	4, 180
Wyoming	217	850	18	340	23	650	8	880	3	345	215	182, 750	18	6, 120	37	24, 050	6	5, 280	5	1, 725
Colorado	592	862	87	254	214	796	14	771	15	292	543	459, 800	67	18, 425	240	187, 200	10	7, 500	15	4, 500
New Mexico	412	699	115	270	91	638	19	646	3	279	479	335, 300	103	30, 900	196	125, 440	15	10, 125	4	1, 200
Arizona	337	684	81	270	86	697	11	690	2	250	409	280, 068	91	24, 570	173	119, 716	11	7, 172	2	500
Utah	107	941	38	206	13	750	7	841	9	206	93	86, 850	38	7, 600	9	6, 750	6	5, 100	9	1, 800
Nevada	103	940	24	227	18	800	6	750	4	231	84	78, 300	26	5, 720	17	13, 600	5	3, 750	2	440
Washington	96	902	80	180	11	750	20	808	44	155	78	71, 200	77	13, 860	11	8, 250	16	13, 600	40	6, 200
Oregon	161	925	58	183	5	750	15	757	42	143	128	124, 160	48	9, 600	4	3, 000	12	9, 360	40	6, 200
California	761	983	362	215	512	851	25	890	25	200	791	735, 250	357	79, 180	483	410, 550	25	21, 250	25	5, 000
Far Western	3, 332	866	944	225	1, 049	794	148	798	177	188	3, 315	2, 799, 178	901	210, 455	1, 239	949, 906	127	100, 837	174	34, 245
United States	17, 910	868	9, 723	172	6, 068	724	788	752	1, 048	191	16, 434	14,134,873	9, 202	1, 566, 770	6, 587	4, 690, 066	676	507, 117	1, 012	196, 960

[1] Preliminary. Bureau of Agricultural Economics, Estimates Division Crop and Livestock Estimates.

TABLE 369.—*Cattle and calves: Value of production and income, average 1924–1928, annual 1928*

State and division	Average, 1924–1928[1]				1928[1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	151	3,106	3,256	2,755	145	3,027	3,172	3,014
New Hampshire	46	1,717	1,763	1,423	60	1,461	1,521	1,488
Vermont	179	4,386	4,565	4,252	219	4,707	4,926	4,894
Massachusetts	111	1,825	1,937	2,178	117	1,808	1,925	2,402
Rhode Island	11	242	253	308		156	156	311
Connecticut	67	1,990	2,058	1,889	28	1,724	1,752	2,003
New York	1,162	23,646	24,808	25,143	1,336	26,514	27,850	31,120
New Jersey	76	1,789	1,865	2,269	110	1,980	2,090	2,997
Pennsylvania	1,688	18,111	19,799	19,612	1,635	20,646	22,281	25,012
North Atlantic	3,491	56,812	60,303	59,829	3,650	62,023	65,673	73,241
Ohio	1,514	25,900	27,414	26,060	1,648	30,503	32,151	31,950
Indiana	926	24,024	24,950	23,732	1,030	27,893	28,923	29,993
Illinois	1,103	48,733	49,836	44,074	1,288	47,640	48,928	48,780
Michigan	1,037	21,488	22,525	21,858	1,411	26,515	27,926	27,220
Wisconsin	524	40,827	41,351	38,339	621	53,857	54,478	49,182
Minnesota	2,298	40,791	43,089	41,964	2,960	48,219	51,179	52,288
Iowa	1,950	113,097	115,047	104,793	2,761	103,397	106,158	117,146
Missouri	637	51,842	52,479	47,848	711	52,300	53,011	55,264
North Dakota	1,003	17,644	18,647	16,683	1,136	19,166	20,302	20,711
South Dakota	1,094	39,660	40,754	35,338	1,214	39,631	40,845	41,306
Nebraska	2,184	87,850	90,034	78,124	2,608	88,816	91,424	90,906
Kansas	1,605	70,298	71,903	68,320	1,810	72,223	74,033	85,115
North Central	15,875	582,154	598,029	547,132	19,198	610,160	629,358	649,861
Delaware	5	553	558	620	6	620	626	737
Maryland	100	3,245	3,346	3,600	103	3,585	3,688	4,490
Virginia	311	10,227	10,537	9,835	290	10,629	10,919	12,981
West Virginia	277	8,269	8,546	7,661	276	8,168	8,444	9,246
North Carolina	281	4,108	4,389	4,019	376	4,716	5,092	5,082
South Carolina	81	2,781	2,862	2,379	84	2,877	2,961	2,824
Georgia	281	5,277	5,558	4,675	356	6,411	6,767	5,951
Florida	81	3,101	3,182	2,292	91	3,662	3,753	2,291
South Atlantic	1,416	37,562	38,978	35,081	1,582	40,668	42,250	43,602
Kentucky	288	12,909	13,197	14,184	284	16,017	16,301	15,796
Tennessee	294	10,324	10,618	9,930	262	12,919	13,181	13,755
Alabama	219	4,235	4,454	3,753	363	4,932	5,295	5,080
Mississippi	118	6,543	6,661	5,826	156	9,442	9,598	8,362
Arkansas	219	5,744	5,962	5,637	222	7,182	7,404	7,456
Louisiana	208	5,004	5,211	4,889	224	5,092	5,316	5,755
Oklahoma	517	20,667	21,184	22,593	571	31,125	31,696	33,159
Texas	1,344	72,750	74,094	68,536	1,668	85,743	87,411	87,657
South Central	3,206	138,176	141,382	135,348	3,750	172,452	176,202	177,020
Montana	759	23,033	23,792	21,464	906	27,207	28,113	27,338
Idaho	198	9,943	10,142	8,966	244	11,944	12,188	10,943
Wyoming	416	12,369	12,785	12,401	536	16,013	16,549	16,687
Colorado	612	25,531	26,143	23,713	632	30,031	30,663	30,823
New Mexico	595	17,725	18,320	14,975	758	24,172	24,930	20,338
Arizona	356	12,209	12,565	7,584	470	15,941	16,411	9,167
Utah	285	6,949	7,234	6,655	318	7,999	8,317	8,227
Nevada	245	6,121	6,366	5,396	264	6,562	6,826	5,855
Washington	520	8,199	8,718	8,031	608	9,370	9,978	10,296
Oregon	341	12,555	12,896	11,227	393	13,918	14,311	13,951
California	1,181	33,581	34,763	30,801	1,441	41,264	42,705	39,827
Far Western	5,509	168,216	173,725	151,212	6,570	204,421	210,991	193,452
United States	29,497	982,920	1,012,417	928,582	34,750	1,089,724	1,124,474	1,137,176

Bureau of Agricultural Economics. Estimates division crop and livestock estimates.

[1] Preliminary.

TABLE 370.—*Hogs: Numbers and value per head in the United States, 1840, 1850, 1860, 1867–1929*

Year	Hogs on farms: Number [1]	Hogs on farms: Value per head Jan. 1 [2]	Hogs on farms and elsewhere Jan 1 [3]	Year	Hogs on farms: Number [1]	Hogs on farms: Value per head Jan. 1 [2]	Hogs on farms and elsewhere Jan 1 [3]
	Thousands	*Dollars*	*Thousands*		*Thousands*	*Dollars*	*Thousands*
1840 [4]	*26,301*			1898	39,760	4.39	55,100
1850 [4]	*30,354*		31,200	1899	38,652	4.40	54,900
1860 [4]	*33,513*		34,500	1900	[5] 37,079	5.28	54,418
1867	24,694	4.03	28,200	1900 [4]	*62,868*		
1868	24,317	3.29	28,300	1900	52,600		
1869	23,316	4.65	27,600	1901	53,200	6.55	55,041
1870 [4]	*25,135*			1902	46,800	7.43	48,419
1870	26,751	5.80	32,300	1903	47,200	8.22	48,833
1871	29,458	5.61	36,400	1904	49,500	6.50	51,213
1872	31,796	4.01	40,100	1905	52,000	6.33	53,799
1873	32,632	3.67	42,100	1906	54,600	6.53	56,489
1874	30,861	3.98	40,700	1907	57,300	8.05	59,283
1875	28,062	4.80	37,800	1908	61,300	6.39	63,421
1876	25,727	6.00	35,500	1909	57,000	6.92	58,972
1877	28,077	5.66	39,500	1910 [4]	*58,186*		
1878	32,262	4.85	46,500	1910	49,300	9.69	50,588
1879	34,766	3.18	51,200	1911	55,700	9.90	57,627
1880 [4]	*47,682*			1912	55,700	8.46	57,627
1880	34,034	4.28	51,200	1913	54,000	10.42	55,868
1881	36,248	4.70	53,100	1914	51,800	10.99	53,592
1882	44,122	5.97	62,900	1915	57,000	10.43	58,972
1883	43,270	6.75	60,000	1916	59,700	8.88	61,766
1884	44,201	5.57	59,600	1917	56,700	12.42	58,662
1885	45,143	5.02	59,300	1918	61,200	20.65	63,318
1886	46,092	4.26	58,900	1919	63,800	23.28	66,007
1887	44,613	4.48	55,500	1920 [4]	*59,346*		
1888	44,347	4.98	53,600	1920	59,959	20.00	62,597
1889	50,302	5.79	59,200	1921	58,602	13.65	61,180
1890 [4]	*57,410*			1922	59,559	10.59	62,179
1890	51,603	4.72	59,100	1923	69,044	12.31	72,082
1891	50,625	4.15	59,400	1924	66,361	10.30	69,281
1892	52,398	4.60	62,900	1925 [4]	*50,854*		
1893	46,095	6.41	56,700	1925	55,568	13.20	58,013
1894	45,206	5.98	57,000	1926	52,148	15.80	54,443
1895	44,166	4.97	57,000	1927	54,788	17.25	57,199
1896	42,843	4.35	56,600	1928	60,420	13.16	63,078
1897	40,600	4.10	55,000	1929	[6] 54,956	13.01	57,374

Bureau of Agricultural Economics. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as based on first report after census data were available; 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 Yearbook.

[2] Series for 1867–1899 are values of all hogs as reported. Data for 1900–1925 are an old series for all hogs as reported, adjusted on basis average relationship between the new and old series from 1926 to 1928. Old series was shown in 1928 Yearbook. Conversion factor was 1.057 (base was old series). Data for 1926–1929 are a new series, referred to above, of average of values by age and sex classification weighted by numbers in each class.

[3] Data for swine on farms and elsewhere as of Jan. 1 prior to 1900 estimated by the Bureau of Animal Industry. Census figures prior to 1920 were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Figures from 1900–1929 are the estimates of the Bureau of Agricultural Economics of swine on farms plus an estimate made by the Bureau of Animal Industry of swine in towns and villages.

[4] Italic figures are from the census. Figures for census years 1880 and 1890 exclude estimate of unenumerated swine on ranges as follows: 1880, 2,093,970; 1890, 17,276. Census dates were June 1 from 1840 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[5] Original estimate of the Bureau of Agricultural Economics.

[6] Preliminary.

TABLE 371.—*Hogs, including pigs: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	56	60	67	70	60	16.30	17.30	16.80	15.00	14.00
New Hampshire	18	19	23	29	30	15.80	15.20	16.60	16.10	15.60
Vermont	45	44	53	56	50	13.30	17.00	15.90	14.90	14.10
Massachusetts	60	67	84	97	92	15.60	17.40	18.00	15.30	15.30
Rhode Island	4	4	4	5	5	18.20	17.80	19.20	18.60	18.00
Connecticut	18	18	21	24	22	20.90	19.30	20.50	20.20	19.60
New York	259	249	284	341	290	15.50	16.50	17.40	15.10	14.20
New Jersey	56	56	60	63	54	16.10	17.80	20.10	14.90	15.50
Pennsylvania	734	683	731	841	715	14.40	16.20	17.50	14.70	13.80
North Atlantic	1,250	1,200	1,327	1,526	1,318	14.93	16.50	17.54	14.98	14.24
Ohio	2,440	2,489	2,439	2,439	2,146	12.60	15.90	17.10	12.60	11.50
Indiana	3,100	2,820	2,961	3,227	2,904	12.10	16.00	17.70	12.90	12.00
Illinois	4,725	4,442	4,709	5,133	4,671	15.10	18.30	19.20	13.70	14.00
Michigan	855	820	845	862	690	13.40	15.20	16.80	12.40	12.40
Wisconsin	1,580	1,660	1,826	1,720	1,462	12.90	16.70	17.00	12.90	14.20
Minnesota	3,600	3,456	3,786	3,710	3,302	15.50	19.00	20.30	15.10	16.00
Iowa	9,633	9,633	10,060	10,900	10,246	17.00	18.70	20.20	14.40	15.00
Missouri	3,864	3,671	3,991	4,270	4,070	10.00	14.40	16.10	11.70	12.20
North Dakota	784	682	572	652	587	13.10	15.90	17.40	13.80	15.00
South Dakota	2,760	2,300	2,183	2,882	2,536	14.50	16.60	19.40	14.70	14.60
Nebraska	4,818	4,700	4,597	5,492	4,888	14.50	17.60	19.50	15.30	15.10
Kansas	2,467	2,220	2,109	2,531	2,531	12.70	15.20	16.60	13.70	12.70
North Central	40,626	38,893	40,078	43,818	40,033	14.30	17.25	18.75	13.88	14.04
Delaware	24	21	24	26	24	12.60	13.70	11.30	12.00	10.80
Maryland	188	179	192	221	199	12.30	14.00	15.20	12.40	10.80
Virginia	584	531	558	642	578	10.40	11.30	12.20	11.20	9.90
West Virginia	184	180	202	232	197	10.90	13.20	13.40	12.90	11.50
North Carolina	894	832	849	951	874	13.00	13.00	14.20	13.50	12.40
South Carolina	580	452	443	509	458	11.50	10.00	12.20	11.20	9.00
Georgia	1,275	1,109	1,187	1,365	1,228	9.80	9.40	10.10	9.40	8.20
Florida	498	458	485	543	516	6.80	7.50	7.50	7.60	8.10
South Atlantic	4,227	3,762	3,940	4,489	4,074	10.61	10.73	11.60	10.86	9.72
Kentucky	932	839	965	1,032	826	9.40	12.40	14.40	9.80	8.40
Tennessee	1,035	880	968	1,026	872	8.60	10.60	13.20	9.70	8.00
Alabama	845	776	854	982	874	10.10	9.90	10.60	10.40	9.50
Mississippi	729	678	744	878	729	7.90	9.80	9.90	8.90	8.70
Arkansas	857	823	946	1,041	885	8.20	9.00	10.20	8.60	8.30
Louisiana	528	496	511	460	437	8.60	8.80	10.10	9.60	10.20
Oklahoma	969	736	883	1,104	994	9.20	10.90	14.10	11.10	9.60
Texas	1,250	1,000	1,250	1,375	1,210	9.40	10.40	14.90	11.50	9.70
South Central	7,145	6,228	7,121	7,898	6,827	8.98	10.32	12.48	10.07	9.02
Montana	280	250	240	288	328	11.90	13.30	16.40	14.30	13.10
Idaho	325	276	318	353	318	10.40	14.00	15.20	12.90	11.70
Wyoming	102	90	110	138	149	10.30	14.60	15.40	13.50	12.30
Colorado	493	443	443	509	550	10.90	13.60	16.00	13.10	12.00
New Mexico	59	47	64	77	73	10.40	13.00	14.10	10.40	10.70
Arizona	19	18	18	19	19	10.70	13.10	13.70	13.00	13.30
Utah	64	60	75	98	98	10.50	12.70	13.50	11.50	10.20
Nevada	25	22	26	29	29	11.30	13.10	14.00	12.30	12.30
Washington	198	168	198	238	214	12.90	14.90	17.00	14.10	12.70
Oregon	223	223	245	270	256	10.20	13.00	14.20	12.20	10.60
California	532	468	585	670	670	9.70	14.60	15.00	13.60	12.60
Far Western	2,320	2,065	2,322	2,689	2,704	10.73	13.87	15.37	13.22	12.11
United States	55,568	52,148	54,788	60,420	54,956	13.20	15.80	17.25	13.16	13.01

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Later, revised figures for 1928–1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Sum of total value of subgroups (classified by age and sex), divided by total number and rounded to nearest dime for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published.

[2] Preliminary.

TABLE 372.—*Hogs: Numbers in countries having 150,000 and over, averages 1909–1913 and 1921–1925, annual 1926–1929*

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
NORTH AMERICA AND WEST INDIES		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Canada	June	3,350	4,344	4,360	4,695	4,497	4,382
United States	January	53,300	61,827	52,148	54,788	60,617	56,880
Mexico	June	[2 3] 811	[4] 1,125	2,903			
Guatemala		188	57	92	70	89	
Salvador		220					
Dominican Republic	May		866				
Haiti				170	185		
Estimated total [5]		59,200	69,200				
SOUTH AMERICA							
Colombia		[6] 711	1,352	1,400	1,366		
Venezuela		195	512				
Peru	February–April		449				
Bolivia		114	362	498		268	
Chile		172	255				
Brazil	September	18,401	[3 7] 16,169				
Uruguay		[3 8] 180	278				
Argentina	December [9]	[3 10] 2,901	[3 11] 1,437				
Estimated total [5]		23,200	20,900				
EUROPE							
England and Wales	June	2,390	2,658	2,200	2,692	2,971	2,364
Isle of Man	do	4	4	3	4	4	
Scotland	do	150	167	145	197	196	160
Northern Ireland	do	215	134	159	236	229	192
Irish Free State	do	1,046	947	884	1,178	1,183	945
Norway [12]	do	[13] 334	216	303	300	283	
Sweden	do	1,023	1,056		1,369		
Denmark	July	2,715	2,314	3,122	3,731	3,363	3,616
Holland	May–June	1,305	1,519				
Belgium	December [9]	1,533	1,081	1,152	1,144	1,124	1,139
France	do [9]	7,529	5,302	5,793	5,777	6,019	6,017
Spain	do [9]	2,544	4,500	5,267	5,032		
Portugal		[3 14] 1,111	1,019				
Italy	March–April	2,685	2,630	[15] 2,850			
Switzerland	April	[3] 570	[3] 640	635			
Germany	December [9]	22,533	15,776	16,200	19,424	22,899	20,070
Austria	do [9]	1,932	1,399				
Czechoslovakia	do [9]	2,516	2,201	2,539			
Hungary	April and July	3,322	2,424	2,520	2,387	2,662	2,582
Yugoslavia	January	3,956	2,875	2,806	2,770	2,663	
Greece	December [9]	346	390	452	510	453	419
Bulgaria	do [9]	546	832		1,002		
Rumania	do [9]	3,262	2,976	3,088	3,168	3,076	2,832
Poland	November	5,487	5,287		6,333		
Lithuania	Spring	1,358	1,521	1,441	1,010	1,060	
Latvia	June	557	465	521	535	535	[15] 388
Estonia	July	252	299	333	354	327	279
Finland	September	422	378	391	418	435	
Russia, European and Asiatic [16]	Summer	[17] 20,336	17,842	20,920	22,445	25,485	21,102
Estimated total (exclusive of Russia) [5]		71,800	61,100				
AFRICA							
Union of South Africa	April–August	[3] 1,082	888	932	870	[18] 855	
Madagascar	February	600	369		335	328	
Estimated total [5]		2,200	1,900				
ASIA							
China (includes Turkestan and Manchuria)		76,819					
Japan	December [9]	297	590	673	621	677	
Chosen	do [9]	629	1,078	1,150	1,221	1,244	1,277
Formosa	do [9]	1,293	1,302	1,435	1,543	1,643	1,718
Siam	March	749	864				
Straits Settlements		139	267				
Philippine Islands	December [9]	1,763	5,768	8,885	9,298	10,568	
Dutch East Indies: Outer Possessions	do [9]		783		833		
Estimated total (exclusive of Russia) [5]		82,700	87,700				

See footnotes at end of table.

TABLE 372.—*Hogs: Numbers in countries having 150,000 and over, averages 1909–1913 and 1921–1925, annual 1926–1929*—Continued

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
		Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
OCEANIA							
Australia	December [9]	910	918	1,128	989	878	
New Zealand	January	[3] 349	396	473	520	587	557
Estimated total [5]		1,300	1,300				
Total countries reporting all periods, including Russia:							
Pre-war to 1928 (29)		135,421	134,937	133,709	142,895	156,622	
Pre-war to 1929 (19)		125,107	121,722	116,955	126,545	139,110	126,919
Estimated world total including Russia [5]		260,700	260,000				

Bureau of Agricultural Economics. Official estimates and International Institute of Agriculture unless otherwise stated.

[1] Average for 5-year period if available, otherwise for any year or years within that period unless otherwise stated. In countries having changed boundaries, the figures are estimated for 1 year only for numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Year 1902.
[3] Census figure.
[4] Incomplete.
[5] These totals include interpolations for a few countries not reporting each year, and rough estimates for some others.
[6] Year 1915.
[7] Year 1920.
[8] Year 1908.
[9] Estimate reported as of December have been considered as of January 1 of the following year, i. e., the figure for the number of hogs in France as of December 31, 1925, has been put in the 1926 column.
[10] June, 1914.
[11] Year 1922.
[12] Number in rural communities.
[13] September.
[14] Year 1906.
[15] Unofficial.
[16] Years 1916, 1923 from the Soviet Union Review, April, 1928, p. 52. Years 1924–1927, Statistical Review, October, 1928. Years 1928 and 1929 from Economic Life, August 14, 1929.
[17] Years 1916.
[18] Number in towns assumed to be same as in 1927, i. e., 22,000, and added in for purposes of comparison with preceding years.
[19] Comparable totals for the number of countries indicated.

TABLE 373.—*Hogs: Results of spring and fall pig surveys for the Corn Belt and the United States, 1923–1929*

Crop	June survey comparisons				December survey comparisons			
	Sows for farrow as compared to preceding spring		Pigs saved		Sows for farrow as compared to preceding fall		Pigs saved	
	Intended [1]	Actual	Compared to preceding spring	Per litter	Intended [1]	Actual	Compared to preceding fall	Per litter
	Per cent	*Per cent*	*Per cent*	*Number*	*Per cent*	*Per cent*	*Per cent*	*Number*
Corn Belt, 1923	115.9	108.3	105.0	4.88	125.4	93.9	96.2	5.02
United States, 1923	113.1	103.9	100.9	5.02	128.3	91.3	93.2	5.07
Corn Belt, 1924	94.6	79.7	82.9	5.02	88.6	69.4	76.6	5.47
United States, 1924	98.8	78.8	80.2	5.05	94.1	71.8	77.8	5.45
Corn Belt, 1925	89.6	80.1	89.4	5.78	100.9	85.4	87.8	5.72
United States, 1925	94.3	81.2	91.3	5.79	104.5	84.6	88.1	5.73
Corn Belt, 1926	111.1	103.5	99.5	5.54	136.4	104.8	104.3	5.68
United States, 1926	111.9	101.7	98.8	5.58	139.0	102.4	103.0	5.77
Corn Belt, 1927	108.9	101.8	101.8	5.55	123.1	109.3	111.3	5.80
United States, 1927	113.2	103.0	103.5	5.62	129.9	110.2	111.0	5.81
Corn Belt, 1928	101.3	91.0	93.0	[2] 5.64	109.1	96.0	98.6	6.04
United States, 1928	105.8	92.3	92.9	[2] 5.63	111.7	93.3	94.7	5.96
Corn Belt, 1929	103.3	92.3	93.9	5.72	117.1	102.8	103.7	6.05
United States, 1929	105.4	90.3	91.6	5.67	117.8	99.8	98.1	6.02
Corn Belt, 1930	105.1							
United States, 1930	106.0							

Bureau of Agricultural Economics.

[1] As shown by preceding survey. [2] Revised, June, 1929.

TABLE 374.—*Hogs: Results of spring and fall pig surveys, by States, 1928–29*

State and division	Sows farrowed				Pigs saved per litter				Intended farrowings			
	Spring, 1928, compared with spring, 1927	Fall, 1928, compared with fall, 1927	Spring, 1929, compared with spring 1928	Fall, 1929, compared with fall, 1928	Spring, 1928	Fall, 1928	Spring, 1929	Fall, 1929	In fall, 1928 compared with actual, 1927	In spring, 1929, compared with actual 1928	In fall, 1929, compared with actual 1928	In spring, 1930, compared with actual 1929
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*No.*	*No.*	*No.*	*No.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct*
Maine	75.3	79.1	67.1	95.5	6.2	6.8	6.6	6.8	94.6	92.1	100.7	89.2
New Hampshire	78.9	103.7	62.5	112.1	6.5	6.1	6.4	7.1	84.9	91.7	132.2	92.0
Vermont	84.5	89.5	79.9	86.4	7.1	7.2	7.3	7.4	93.6	81.2	113.4	107.6
Massachusetts	133.6	115.1	93.8	101.0	5.8	6.8	5.2	8.1	70.3	114.7	89.8	102.8
Rhode Island	133.3	89.0	74.4	111.1	6.3	6.5	6.4	6.0	244.4	91.4	110.8	144.4
Connecticut	118.3	61.7	68.8	132.0	6.4	7.8	7.2	6.6	112.5	77.2	117.9	158.3
New York	82.2	78.1	70.4	90.7	6.5	7.3	7.2	6.8	86.9	92.4	101.9	89.5
New Jersey	89.1	84.4	88.2	83.6	5.8	5.1	5.9	6.0	100.4	86.7	115.6	96.9
Pennsylvania	85.4	91.6	75.4	94.7	6.0	6.3	6.7	6.5	103.6	95.0	99.4	97.5
North Atlantic	85.0	91.1	75.0	93.3	6.00	6.75	7.00	6.67	95.2	95.2	98.9	96.4
Ohio	95.2	92.6	91.7	91.7	6.1	6.5	6.7	6.5	106.8	98.6	106.3	98.5
Indiana	91.7	92.9	89.8	89.2	6.0	6.3	6.3	6.3	109.7	98.6	103.7	100.6
Illinois	90.6	98.7	88.6	103.3	5.8	6.2	5.9	6.2	105.1	106.8	115.2	107.0
Michigan	77.9	83.7	79.0	89.9	6.6	6.7	6.8	6.8	97.8	92.7	102.2	91.1
Wisconsin	82.1	84.6	90.2	105.6	6.3	6.3	6.3	6.4	86.7	101.5	127.0	107.5
Minnesota	80.7	90.5	94.7	108.2	5.6	5.8	5.7	5.9	103.3	102.9	136.1	106.5
Iowa	88.8	107.4	92.9	123.6	5.5	5.8	5.5	5.7	112.4	105.0	120.0	107.2
Missouri	100.7	96.4	93.7	86.7	[1]6.0	6.1	5.8	6.2	112.1	104.8	109.7	97.1
North Dakota	90.6	97.2	98.3	116.4	5.8	5.6	5.5	5.7	147.0	120.4	205.9	104.7
South Dakota	92.5	87.0	90.7	97.3	5.3	5.6	5.4	5.3	116.5	102.7	166.3	110.7
Nebraska	98.8	88.0	91.4	106.3	5.0	5.3	5.3	5.9	110.9	99.3	114.3	104.8
Kansas	97.4	101.4	101.7	106.0	5.8	6.0	5.5	6.0	123.9	110.2	119.0	106.3
North Central	93.4	96.0	92.2	103.0	5.65	6.04	5.71	6.04	109.5	103.8	118.3	105.1
Corn Belt	91.0	96.0	92.3	102.8	5.64	6.04	5.72	6.05	109.1	103.3	117.1	105.1
Delaware	86.1	98.1	100.7	88.9	6.5	6.1	6.6	6.9	117.3	107.1	113.4	109.0
Maryland	98.5	103.5	103.5	94.0	6.3	6.0	6.0	7.1	106.6	101.1	110.2	98.7
Virginia	96.6	88.0	77.8	96.7	6.2	6.6	6.6	6.7	102.3	98.2	106.7	101.7
West Virginia	78.3	85.4	88.4	93.8	6.9	6.9	7.0	6.7	98.7	90.9	135.8	93.0
North Carolina	100.0	96.4	80.8	83.4	5.8	5.4	5.4	5.8	115.8	112.2	104.0	104.1
South Carolina	97.8	79.7	89.8	80.9	5.2	5.2	4.8	5.7	127.3	107.1	147.1	122.0
Georgia	109.0	92.7	90.1	87.7	5.4	5.5	5.7	5.7	133.7	122.7	132.8	125.4
Florida	92.1	98.4	89.8	86.4	5.2	5.2	5.1	5.1	119.6	127.0	114.1	132.6
South Atlantic	100.7	91.4	85.7	88.5	5.57	5.71	5.57	5.95	118.7	114.4	120.4	115.7
Kentucky	82.2	67.9	73.0	83.2	6.2	6.4	6.4	6.4	96.9	89.0	101.8	96.1
Tennessee	89.5	89.4	79.5	82.4	5.9	6.2	6.2	6.5	103.6	99.0	111.4	106.4
Alabama	108.9	84.1	89.4	87.2	5.1	4.6	5.4	5.3	125.7	112.4	125.8	116.6
Mississippi	91.5	82.5	84.5	92.2	5.4	5.2	5.4	5.5	127.0	120.9	128.3	129.4
Arkansas	84.5	77.0	73.2	74.3	[1]5.0	5.1	5.1	5.3	113.4	117.6	132.8	107.1
Louisiana	84.4	80.5	88.2	81.4	5.0	5.2	4.8	5.4	138.9	143.8	151.6	114.9
Oklahoma	93.6	88.9	78.1	83.9	5.4	5.6	5.7	6.0	129.0	100.9	120.4	106.3
Texas	99.5	78.1	70.1	73.5	5.4	5.7	5.2	5.5	138.1	106.2	109.2	103.1
South Central	92.3	80.8	78.3	81.5	5.43	5.64	5.30	5.82	119.0	108.9	117.6	108.6
Montana	107.6	121.1	95.0	106.2	5.7	5.7	6.0	6.5	151.0	121.1	132.1	91.6
Idaho	85.2	82.1	84.3	80.4	5.8	6.1	6.1	6.2	88.4	98.1	130.1	96.4
Wyoming	106.5	116.3	113.4	135.7	5.9	5.0	3.4	5.1	191.5	121.1	112.2	113.0
Colorado	109.8	124.6	98.6	116.6	5.6	5.5	5.3	5.6	141.8	129.8	131.4	113.5
New Mexico	114.7	103.0	96.4	81.7	4.4	5.2	5.4	6.0	178.5	119.2	143.6	106.5
Arizona	142.0	95.1	117.1	87.4	7.3	5.2	5.6	6.1	127.8	94.1	121.6	116.8
Utah	112.4	92.2	70.0	96.4	6.1	6.5	6.3	6.3	174.3	123.0	144.1	147.0
Nevada	116.3	101.0	96.2	95.5	7.0	6.6	5.4	6.2	150.0	155.4	142.4	126.5
Washington	117.6	105.3	89.2	88.3	6.5	6.5	6.1	6.8	124.0	93.5	106.2	93.5
Oregon	111.0	97.7	89.5	96.2	6.3	6.4	7.0	7.1	130.6	98.1	101.3	109.3
California	119.5	94.7	84.6	84.1	[1]6.0	6.1	6.2	5.9	20.2	111.1	110.4	96.9
Far Western	105.8	103.7	93.0	100.4	6.00	5.92	5.67	6.14	112.6	113.7	119.4	103.2
United States	92.3	93.3	90.3	98.1	5.63	5.96	5.67	6.02	111.7	105.4	117.8	106.0

Bureau of Agricultural Economics.

[1]Revised June, 1929.

TABLE 375.—*Hogs: Receipts at principal public stockyards and all public stockyards, 1909–1929*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	St. Joseph	South St. Paul	Sioux City	Total 9 markets [1]	All other stockyards reporting	Total all stockyards reporting
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1909	6,619	242	2,473	868	3,093	2,135	1,694	725	1,077	18,926	(2)	(2)
1910	5,587	187	2,054	541	2,086	1,894	1,353	836	1,044	15,582	(2)	(2)
1911	7,103	220	3,124	556	3,168	2,367	1,922	911	1,349	20,720	(2)	(2)
1912	7,181	222	2,530	388	2,523	2,886	1,970	984	1,698	20,382	(2)	(2)
1913	7,571	247	2,584	404	2,568	2,543	1,869	1,257	1,533	20,576	(2)	(2)
1914	6,618	256	2,559	515	2,265	2,259	1,725	1,590	1,257	19,044	(2)	(2)
1915	7,652	344	2,592	464	2,531	2,643	1,698	2,155	1,761	21,840	14,373	36,213
1916	9,188	467	3,057	968	2,979	3,117	2,199	2,675	2,131	26,781	16,484	43,265
1917	7,169	352	2,706	1,062	2,277	2,797	1,920	1,928	2,149	22,360	15,682	38,042
1918	8,614	384	3,256	762	3,328	3,430	2,351	2,061	2,421	26,607	18,256	44,863
1919	8,672	368	3,651	588	3,141	3,179	2,126	2,190	2,322	26,237	18,232	44,469
1920	7,526	341	3,399	413	2,466	2,708	1,914	2,247	2,173	23,187	18,934	42,121
1921	8,148	334	3,330	382	2,205	2,665	1,785	2,210	1,739	22,798	18,303	41,101
1922	8,156	395	3,606	510	2,655	2,839	2,061	2,523	1,856	24,601	19,467	44,068
1923	10,460	495	4,831	486	3,615	3,649	2,457	3,338	2,989	32,320	23,010	55,330
1924	10,443	569	4,580	392	2,933	3,978	2,234	3,751	3,732	32,612	22,802	55,414
1925	7,996	467	3,512	312	2,067	3,355	1,673	3,637	3,396	26,415	17,514	43,929
1926	7,093	497	3,536	217	2,036	2,647	1,462	3,451	2,475	23,414	16,358	39,772
1927	7,724	457	3,710	338	1,904	2,631	1,425	3,105	2,322	23,616	17,795	41,411
1928	8,539	567	4,036	432	2,391	3,179	1,724	2,902	2,754	26,524	20,003	46,527
1929	8,193	539	3,865	402	2,476	3,166	1,627	2,869	2,313	25,450	18,647	44,097

Bureau of Agricultural Economics. Prior to 1915 receipts compiled from yearbooks of stockyard companies; subsequent figures compiled from data of the livestock and meat reporting service of the bureau. Receipts, 1900–1908, are available in 1924 Yearbook, p. 902, Table 500.

[1] Total of the rounded detail figures.
[2] Figures not available prior to 1915.

TABLE 376.—*Hogs: Receipts at all public stockyards, 1915–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1915 [1]	3,959	3,449	3,199	2,487	2,768	2,874	2,368	2,024	1,966	2,457	3,728	4,934	36,213
1916 [1]	5,309	4,233	3,489	2,852	3,332	3,054	2,524	2,634	2,386	3,640	4,873	4,939	43,265
1917	5,084	3,933	3,369	2,961	3,264	2,791	2,563	1,853	1,615	2,676	3,941	3,992	38,042
1918	4,444	4,486	4,424	3,696	3,345	2,979	3,099	2,467	2,376	3,399	4,594	5,554	44,863
1919	5,855	4,412	3,643	3,648	3,831	3,773	2,974	2,095	2,397	3,121	3,740	4,980	44,469
1920	5,262	3,422	3,940	3,024	4,210	3,709	2,811	2,491	2,391	2,789	3,872	4,200	42,121
1921	4,700	4,009	3,386	3,229	3,328	3,579	2,727	2,656	2,655	3,214	3,687	3,931	41,101
1922	4,278	3,613	3,411	3,067	3,737	3,776	2,980	3,037	3,062	3,682	4,421	5,004	44,068
1923	5,306	4,492	4,927	4,318	4,524	4,204	4,181	3,714	3,607	4,816	5,416	5,825	55,330
1924	6,253	5,335	4,833	4,374	4,321	4,296	4,091	3,197	3,216	3,990	4,904	6,604	55,414
1925	6,105	4,558	3,528	3,247	3,283	3,507	2,798	2,549	2,741	3,390	3,843	4,380	43,929
1926	4,304	3,372	3,579	3,135	3,037	3,143	2,854	2,804	2,819	3,261	3,554	3,910	39,772
1927	4,252	3,308	3,754	3,142	3,613	3,775	3,046	3,042	2,565	3,039	3,666	4,209	41,411
1928	5,306	5,267	4,639	3,483	3,723	3,548	2,924	2,523	2,600	3,666	4,075	4,773	46,527
1929	5,133	4,000	3,436	3,582	3,431	3,275	3,297	2,964	3,089	3,701	3,933	4,256	44,097

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau.

[1] Complete information for 1915 and 1916, particularly on disposition of stock, is not obtainable from many of these markets.

NOTE.—A table similar to Table 378, 1928 Yearbook, receipts, local slaughter, and stocker and feeder shipments of hogs, is omitted.

TABLE 377.—*Hogs: Monthly average live weight, Chicago, 1909–1929*

Year beginning October	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Average Oct.–Mar.[1]	Apr.	May	June	July	Aug.	Sept.	Average Apr.–Sept.[1]
1909	227	225	214	210	213	218	218	227	239	242	246	255	259	245
1910	253	232	224	226	230	239	234	241	242	236	233	239	224	236
1911	212	208	213	212	217	218	213	227	232	235	239	240	235	235
1912	226	222	223	226	230	240	228	242	242	244	243	233	222	238
1913	209	207	213	216	224	233	217	233	236	237	244	248	242	240
1914	229	218	226	223	224	231	225	233	233	231	238	246	235	236
1915	204	187	190	195	204	214	199	219	220	226	231	232	223	225
1916	210	195	193	199	204	209	202	213	217	225	232	233	231	225
1917	212	209	211	216	231	238	220	242	238	235	243	243	247	241
1918	233	226	223	228	232	230	229	230	232	233	242	251	254	240
1919	237	226	224	239	239	244	235	248	245	243	252	258	258	251
1920	247	234	230	234	234	241	237	242	239	241	250	259	262	249
1921	243	225	226	231	236	244	234	246	244	247	259	268	265	255
1922	243	231	234	239	241	247	239	249	242	242	250	253	254	248
1923	247	234	231	227	229	237	234	239	239	241	251	255	254	246
1924	235	220	214	220	222	229	223	235	236	238	249	256	253	244
1925	242	228	225	231	235	245	234	244	247	255	271	281	267	261
1926	232	217	220	226	229	240	227	239	243	248	257	265	261	252
1927	235	215	217	225	230	235	226	233	234	239	251	257	251	244
1928	247	238	231	228	228	238	235	241	239	247	257	265	259	251
1929	242	223	224	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Figures for 1909–1919 compiled from Chicago Drovers Journal Yearbook; subsequent figures from data of the livestock and meat reporting service of the bureau, which are the weighted average of packer and shipper purchases. Data for 1900–1908 are available in 1924 Yearbook, p. 909, Table 506.

[1] Simple average.

TABLE 378.—*Feeder hogs, inspected: Shipments from public stockyards, 1920–1928*

Origin and destination	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Market origin:									
Denver, Colo	8	4	3	12	9	7	7	9	8
East St. Louis, Ill	40	30	41	33	22	24	27	37	30
Fort Worth, Tex	29	45	38	24	9	13	14	16	11
Indianapolis, Ind	17	18	17	16	15	14	22	14	14
Kansas City, Kans	148	78	151	265	119	55	97	86	95
Los Angeles, Calif	--------	--------	2	13	1	5	1	2	2
Louisville, Ky	10	11	18	2	2	2	3	6	4
Oklahoma City, Okla	32	10	20	28	10	10	10	10	16
Omaha, Nebr	12	7	7	15	21	15	15	36	38
Portland, Oreg	11	11	17	19	20	18	20	16	19
Sioux City, Iowa	22	12	7	10	5	5	13	6	3
South St. Joseph, Mo	5	1	--------	2	2	15	23	20	26
South St. Paul, Minn	105	97	112	136	118	157	357	301	197
Wichita, Kans	25	11	16	31	27	14	5	7	7
All other inspected	66	36	44	36	34	42	53	70	70
Total	530	371	493	642	414	396	667	636	540
State destination:									
California	--------	--------	9	17	2	4	3	4	4
Colorado	--------	--------	--------	10	6	7	6	7	7
Illinois	61	40	63	96	44	47	106	64	41
Indiana	29	28	47	25	20	34	101	62	31
Iowa	133	76	120	176	74	33	75	78	75
Kansas	44	32	29	26	17	18	16	28	55
Kentucky	6	11	--------	--------	--------	--------	11	24	5
Michigan	--------	--------	10	10	15	20	31	23	17
Minnesota	26	25	34	34	40	40	51	42	41
Missouri	64	36	46	70	37	32	46	56	47
Nebraska	24	15	23	63	34	24	20	85	87
Ohio	11	12	11	11	8	23	77	35	6
Oklahoma	37	24	24	14	11	10	10	13	14
Oregon	10	10	12	18	19	17	19	15	18
Tennessee	--------	--------	--------	6	5	6	11	6	5
Texas	22	12	11	19	26	23	27	18	14
All other	63	50	54	47	56	58	57	76	73
Total[1]	530	371	493	642	414	396	667	636	540

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes other shipments as follows: To Alaska, 543 head in 1923, 785 head in 1924, 577 head in 1925, 713 head in 1926, and 869 head in 1927; to Hawaii, 412 head in 1923.

TABLE 379.—*Feeder hogs, inspected: Shipments from public stockyards, by months, 1929*

Origin and destination	January	February	March	April	May	June	July	August	September	October	November	December	Total
	Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Market origin:													
Denver, Colo.	856	659	450	479	272	226	446	284	729	501		848	5, 750
East St. Louis, Ill.	1, 170	2, 205	2, 844	5, 178	2, 484	1, 983	2, 225	2, 345	2, 043	1, 654	1, 058	825	26, 014
Fort Worth, Tex.	631	585	3, 452	2, 629	1, 050	1, 230	748	1, 223	820	418	405	390	13, 581
Indianapolis, Ind.	868	322	522	865	1, 299	1, 493	576		517	325	600	265	7, 652
Kansas City, Kans.	6, 336	9, 786	20, 144	18, 740	9, 032	10, 888	4, 303	6, 061	4, 846	3, 463	5, 838	4, 095	103, 532
Los Angeles, Calif.	34			401	335	4	171	233	173	222	84	307	1, 964
Oklahoma City, Okla.	1, 450	1, 323	1, 970	2, 632	674	1, 548	750	1, 346	767	908	845	1, 549	15, 762
Omaha, Nebr.	2, 619	2, 636	3, 980	3, 580	2, 496	2, 732	1, 961	1, 251	956	1, 220	1, 174	1, 755	26, 360
Portland, Oreg.	1, 332	1, 190	2, 111	1, 644	1, 886	1, 372	1, 087	1, 919	1, 841	2, 622	1, 953	1, 213	20, 170
Sioux City, Iowa	274	11	112	167	76	58	67	80	227	144	159	26	1, 401
South St. Joseph, Mo.	1, 357	1, 843	1, 722	1, 334	1, 442	1, 612	1, 296	1, 909	889	680	1, 188	1, 336	16, 608
South St. Paul, Minn.	10, 240	10, 616	13, 244	11, 625	11, 771	9, 636	6, 248	8, 783	15, 030	24, 878	23, 953	11, 472	157, 496
Wichita, Kans.	292		164	368	105	70		302	759	474	148	536	3, 218
All other inspected	5, 199	4, 635	7, 776	10, 339	7, 869	6, 142	5, 398	5, 739	4, 630	5, 227	4, 917	4, 738	72, 609
Total	32, 658	35, 811	58, 491	59, 981	40, 791	38, 994	25, 276	31, 475	34, 227	42, 736	42, 322	29, 355	472, 117
State destination:													
California	34		257	401	335	4	171	233	173	222	84	307	2, 221
Colorado	1, 007	500	450	479	272	226	446	284	818	501		848	5, 831
Illinois	2, 500	1, 902	3, 622	6, 814	3, 150	2, 525	2, 828	1, 708	2, 782	3, 640	3, 393	2, 225	37, 089
Indiana	1, 298	887	1, 349	3, 564	3, 235	2, 750	1, 429	819	939	1, 505	1, 329	928	20, 032
Iowa	5, 466	4, 991	10, 797	11, 779	7, 762	7, 322	2, 959	4, 095	4, 149	4, 732	5, 546	4, 395	74, 493
Kansas	2, 545	3, 791	5, 894	6, 165	2, 789	3, 290	1, 238	2, 086	1, 649	1, 985	3, 174	2, 276	36, 882
Michigan	540	3, 162	1, 614	1, 951	1, 271	2, 048	1, 958	1, 732	745	3, 283	1, 496	141	19, 941
Minnesota	1, 885	2, 395	3, 545	3, 792	4, 447	4, 050	2, 277	3, 508	4, 715	6, 817	7, 581	4, 683	49, 695
Missouri	2, 879	5, 324	10, 455	7, 829	4, 035	4, 298	1, 879	2, 290	1, 878	1, 493	1, 920	1, 293	45, 573
Nebraska	2, 248	3, 573	6, 614	3, 794	2, 366	2, 271	1, 983	1, 483	1, 399	1, 951	3, 373	1, 757	32, 812
Ohio	380	291	184	523	579	484	418	697	392	756	1, 917	1, 002	7, 623
Oklahoma	1, 304	1, 323	1, 235	1, 981	674	1, 141	750	1, 192	767	616	546	1, 385	12, 914
Oregon	1, 024	1, 096	2, 024	1, 509	1, 611	1, 257	1, 000	1, 791	1, 543	2, 256	1, 697	1, 105	17, 913
Tennessee	552	467	344	483	452	263	876	371	233	722	261	627	5, 651
Texas	1, 622	895	1, 772	1, 438	887	1, 122	754	1, 451	960	874	1, 163	1, 018	13, 956
All other	7, 154	5, 214	8, 335	7, 339	6, 643	5, 838	4, 303	7, 735	11, 082	11, 383	8, 842	4, 865	89, 491
Total	[1] 32, 658	35, 811	58, 491	[2] 59, 981	[3] 40, 791	[4] 38, 994	[5] 25, 276	31, 475	[6] 34, 227	42, 736	42, 322	29, 355	472, 117

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 220 head shipped to Cuba.
[2] Includes 140 head shipped to Alaska.
[3] Includes 283 head shipped to Alaska.
[4] Includes 105 head shipped to Alaska.
[5] Includes 7 head shipped to Alaska.
[6] Includes 3 head shipped to Alaska.

TABLE 380.—*Hogs: Estimated price per 100 pounds received by producers in the United States, 1910–1929*

Year beginning November	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	7.61	7.16	7.44	7.04	6.74	6.17	5.72	5.66	5.92	6.54	6.53	6.09	6.61
1911	5.86	5.72	5.74	5.79	5.94	6.78	6.79	6.65	6.64	7.11	7.47	7.70	6.43
1912	7.05	6.89	6.77	7.17	7.62	7.94	7.45	7.61	7.81	7.79	7.68	7.60	7.39
1913	7.33	7.16	7.45	7.75	7.80	7.80	7.60	7.43	7.72	8.11	8.11	7.43	7.60
1914	7.00	6.67	6.57	6.34	6.33	6.48	6.77	6.80	6.84	6.61	6.79	7.18	6.69
1915	6.35	6.02	6.32	7.07	7.86	8.21	8.37	8.21	8.40	8.61	9.22	8.67	7.61
1916	8.74	8.76	9.16	10.33	12.32	13.61	13.72	13.50	13.35	14.24	15.69	16.15	12.10
1917	15.31	15.73	15.26	15.03	15.58	15.76	15.84	15.37	15.58	16.89	17.50	16.50	15.78
1918	15.92	15.82	15.69	15.53	16.13	17.39	18.00	17.80	19.22	19.30	15.81	13.88	16.60
1919	13.36	12.66	13.36	13.62	13.59	13.73	13.44	13.18	13.65	13.59	13.98	13.57	13.43
1920	11.64	8.90	8.72	8.58	9.13	7.96	7.62	7.22	8.09	8.73	7.51	7.31	8.52
1921	6.66	6.52	6.89	8.24	9.08	8.83	9.05	9.11	9.12	8.54	8.23	8.33	8.10
1922	7.78	7.63	7.77	7.65	7.52	7.45	7.13	6.37	6.68	6.85	7.81	7.23	7.34
1923	6.66	6.39	6.59	6.54	6.63	6.70	6.68	6.55	6.60	8.54	8.50	9.45	7.06
1924	8.62	8.39	9.31	9.62	11.83	11.64	10.78	10.82	12.02	12.19	11.50	11.16	10.46
1925	10.66	10.51	10.99	11.76	11.65	11.49	11.97	12.80	12.69	11.66	12.07	12.06	11.63
1926	11.45	10.97	10.97	11.19	10.89	10.41	9.41	8.40	8.58	9.24	9.78	10.16	10.21
1927	8.99	8.14	7.81	7.62	7.48	7.75	8.82	8.70	9.64	10.01	11.17	9.55	8.67
1928	8.51	7.93	8.18	8.88	10.00	10.20	9.96	9.80	10.33	10.28	9.53	9.10	9.27
1929	8.54	8.53	------	------	------	------	------	------	------	------	------	------	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of hogs Jan. 1, by States; yearly price obtained by weighing monthly prices by Federal inspected slaughter.

TABLE 381.—*Hogs: Average price per 100 pounds at Chicago, by months, 1901–1929*

Year beginning October	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Simple average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1901	6.10	5.65	5.95	6.20	6.10	6.35	6.95	7.00	7.35	7.65	7.15	7.55	6.67
1902	7.00	6.30	6.20	6.40	6.75	7.30	7.20	6.45	6.00	5.55	5.45	5.85	6.37
1903	5.55	4.65	4.45	4.90	5.15	5.35	5.10	4.65	5.05	5.40	5.30	5.75	5.11
1904	5.40	4.80	4.50	4.65	4.85	5.15	5.45	5.40	5.35	5.65	5.95	5.50	5.22
1905	5.25	4.85	4.90	5.40	6.00	6.30	6.55	6.45	6.55	6.65	6.25	6.25	5.95
1906	6.40	6.20	6.25	6.60	7.05	6.65	6.65	6.40	6.10	6.05	6.00	6.00	6.36
1907	6.15	4.90	4.70	4.40	4.45	5.00	5.85	5.50	5.80	6.50	6.55	6.85	5.55
1908	5.95	5.80	5.65	6.10	6.35	6.70	7.20	7.30	7.65	7.85	7.75	8.20	6.88
1909	7.75	8.00	8.35	8.55	9.05	10.55	9.90	9.55	9.45	8.75	8.35	8.90	8.93
1910	8.50	7.60	7.65	7.95	7.40	6.85	6.25	6.00	6.25	6.70	7.30	6.90	7.11
1911	6.45	6.30	6.40	6.25	6.20	7.10	7.80	7.65	7.50	7.65	8.25	8.45	7.17
1912	8.75	7.75	7.40	7.45	8.15	8.90	9.05	8.55	8.65	9.05	8.35	8.30	8.36
1913	8.20	7.75	7.70	8.30	8.60	8.70	8.65	8.45	8.20	8.70	9.00	8.85	8.42
1914	7.65	7.50	7.10	6.90	6.80	6.75	7.30	7.60	7.60	7.25	6.90	7.25	7.22
1915	7.90	6.65	6.40	7.20	8.20	9.65	9.75	9.85	9.70	9.80	10.30	10.70	8.84
1916	9.80	9.60	9.95	10.90	12.45	14.80	15.75	15.90	15.50	15.20	16.90	18.20	13.75
1917	17.15	17.40	16.85	16.30	16.65	17.10	17.45	17.45	16.60	17.75	19.00	19.65	17.45
1918	17.70	17.70	17.55	17.60	17.65	19.10	20.40	20.60	20.40	21.85	20.00	17.45	19.00
1919	14.35	14.20	13.60	14.97	14.55	14.94	14.79	14.28	14.68	14.84	14.74	15.88	14.65
1920	14.17	11.83	9.55	9.41	9.42	10.00	8.50	8.35	8.19	9.69	9.26	7.61	9.66
1921	7.72	7.01	6.92	8.02	9.90	10.43	10.31	10.48	10.33	9.70	8.51	8.75	9.01
1922	8.80	8.07	8.18	8.29	8.02	8.18	8.08	7.53	6.92	7.04	7.65	8.35	7.93
1923	7.42	6.85	6.87	7.10	7.06	7.35	7.36	7.34	7.04	7.68	9.38	9.57	7.58
1924	9.91	8.97	9.38	10.38	11.06	13.55	12.55	12.06	12.57	13.46	12.66	12.52	11.59
1925	11.31	11.28	10.97	12.02	12.45	12.20	12.33	13.55	14.01	12.51	11.48	12.03	12.18
1926	12.72	11.80	11.57	11.96	11.73	11.28	10.69	9.59	8.78	9.05	9.03	10.22	10.70
1927	10.39	8.92	8.32	8.25	8.08	8.08	9.28	9.67	9.91	10.65	11.53	11.89	9.58
1928	9.57	8.83	8.61	9.22	10.19	11.44	11.41	10.81	10.72	11.20	10.52	9.85	10.20
1929	9.38	9.06	9.34	-------	-------	-------	-------	-------	-------	-------	-------	-------	-------

Bureau of Agricultural Economics. Figures prior to 1920 are general average hog prices as published in the Chicago Drovers Journal Yearbook; subsequent figures compiled from reports of packer and shipper purchases; such purchases do not include pigs, boars, stags, extremely rough sows, or cripples.

TABLE 382.—*Hogs: Average price per 100 pounds at Chicago and Omaha, by months, July, 1927, to December, 1929*

Year and month	Chicago						Omaha					
	Butcher, bacon, and shipper hogs				Packing sows, rough and smooth, all weights	Average cost, packer and shipper hogs	Butcher, bacon, and shipper hogs			Packing sows, rough and smooth, all weights	Feeder and stocker pigs, 70 to 130 pounds, medium to choice	Average cost, packer and shipper hogs
	Heavy weight, 250 to 350 pounds, medium to choice	Medium weight, 200 to 250 pounds, medium to choice	Light weight, 160 to 200 pounds, medium to choice	Light lights, 130 to 160 pounds, medium to choice			Heavy weight, 250 to 350 pounds, medium to choice	Medium weight, 200 to 250 pounds, medium to choice	Light weight, 160 to 200 pounds, medium to choice			
1927	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
July	9.16	9.80	9.94	9.68	7.83	9.05	8.89	9.61	9.72	7.70	7.92	8.60
August	9.32	10.14	10.25	9.90	7.83	9.03	8.99	9.75	10.08	7.81	8.45	8.45
September	10.88	11.39	11.21	10.42	9.56	10.22	10.59	10.90	10.79	9.68	9.21	10.03
October	11.12	11.22	10.86	9.98	9.51	10.39	10.46	10.73	10.32	9.42	9.78	9.97
November	9.45	9.33	8.90	8.32	8.00	8.92	8.86	9.04	8.65	7.75	8.93	8.62
December	8.53	8.47	8.17	7.87	7.56	8.32	8.21	8.21	7.93	7.29	7.57	8.12
Average, 6 months	9.74	10.06	9.89	9.36	8.38	9.32	9.33	9.71	9.58	8.28	8.64	8.96
1928												
January	8.26	8.34	8.17	7.89	7.25	8.25	8.02	8.06	7.91	7.10	7.17	7.98
February	7.99	8.21	8.12	7.76	7.15	8.08	7.63	7.81	7.78	6.75	6.46	7.66
March	7.99	8.23	8.10	7.58	7.14	8.08	7.66	7.88	7.78	6.82	6.50	7.74
April	9.10	9.32	9.22	8.65	8.04	9.28	8.72	8.95	8.87	7.76	7.16	8.82
May	9.62	9.76	9.37	8.70	8.71	9.67	9.18	9.39	9.10	8.38	7.39	9.21
June	10.04	10.06	9.74	9.07	9.01	9.91	9.66	9.68	9.26	8.68	7.43	9.42
July	10.84	10.94	10.77	10.28	9.77	10.65	10.60	10.68	10.16	9.26	8.19	10.20
August	11.64	11.86	11.69	11.36	10.63	11.53	11.18	11.42	11.06	10.16	9.28	10.89
September	12.14	12.26	11.98	11.60	11.02	11.89	11.56	11.81	11.54	10.56	10.14	11.35
October	9.73	9.77	9.63	9.28	8.84	9.57	9.37	9.40	9.17	8.48	8.59	9.16
November	8.92	8.92	8.74	8.44	8.18	8.83	8.55	8.57	8.34	7.92	7.33	8.52
December	8.65	8.66	8.56	8.20	7.97	8.61	8.20	8.22	7.97	7.71	6.63	8.25
Average	9.58	9.69	9.51	9.07	8.64	9.22	9.19	9.32	9.08	8.30	7.69	8.87
1929												
January	9.11	9.20	9.20	8.92	8.37	9.22	8.79	8.82	8.76	8.15	7.38	8.84
February	10.31	10.37	10.32	9.87	9.60	10.19	9.90	9.94	9.85	9.35	7.98	9.83
March	11.45	11.54	11.44	10.95	10.58	11.44	11.00	11.06	10.80	10.36	9.54	11.04
April	11.40	11.48	11.38	10.92	10.42	11.41	10.96	11.01	10.86	10.19	9.58	10.98
May	10.75	10.95	10.79	10.57	9.78	10.81	10.23	10.41	10.22	9.37	9.23	10.28
June	10.69	10.91	10.86	10.72	9.58	10.72	10.28	10.55	10.44	9.27	9.56	10.31
July	11.23	11.69	11.78	11.57	10.03	11.20	10.74	11.18	11.10	9.75	9.92	10.69
August	10.70	11.29	11.52	11.20	9.27	10.52	10.13	10.74	10.79	8.90	9.54	9.86
September	9.97	10.53	10.48	9.98	8.68	9.85	9.50	9.99	9.86	8.28	8.24	9.20
October	9.42	9.68	9.71	9.51	8.29	9.38	8.89	9.22	9.11	7.84	8.42	8.78
November	9.06	9.14	9.02	8.84	8.24	9.06	8.62	8.74	8.65	7.80	7.62	8.56
December	9.40	9.44	9.38	9.20	8.32	9.34	8.92	9.00	8.88	8.07	7.44	8.96
Average	10.29	10.52	10.49	10.19	9.26	10.16	9.83	10.06	9.94	8.94	8.70	9.84

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 1012–1014.

TABLE 383.—*Hogs: Monthly slaughter[1] under Federal inspection, 1907–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	3,410	2,921	2,665	2,667	3,317	3,241	2,929	2,301	1,988	2,219	2,135	3,094	32,885
1908	4,961	3,890	3,111	2,304	3,088	3,094	2,416	2,231	2,231	3,368	3,803	4,147	38,643
1909	3,876	2,653	3,013	2,343	2,629	2,719	2,097	1,822	1,955	2,397	2,800	3,090	31,395
1910	2,693	2,324	1,891	1,778	2,206	2,612	1,988	1,824	1,564	1,851	2,456	2,827	26,014
1911	2,742	2,633	2,973	2,589	3,008	3,462	2,560	2,032	2,172	2,720	3,639	3,603	34,133
1912	4,147	3,302	2,700	2,412	2,844	2,835	2,354	1,875	1,701	2,455	3,020	3,407	33,053
1913	3,708	2,844	2,334	2,487	3,046	3,057	2,557	2,268	2,133	2,681	3,165	3,919	34,199
1914	3,489	2,723	2,548	2,312	2,569	2,926	2,260	1,799	1,907	2,682	3,047	4,271	32,532
1915	4,274	3,885	3,446	2,563	2,869	3,246	2,493	2,041	1,890	2,494	3,739	5,442	38,381
1916	5,387	4,276	3,430	2,853	3,275	3,163	2,530	2,517	2,287	3,327	4,771	5,267	43,084
1917	4,629	3,484	2,985	2,645	3,084	2,685	2,411	1,705	1,322	2,195	3,043	3,723	33,910
1918	3,961	3,998	3,926	3,290	3,092	2,783	2,940	2,283	1,980	3,018	4,280	5,662	41,214
1919	5,846	4,266	3,443	3,208	3,743	3,728	2,884	1,949	1,997	2,686	3,270	4,790	41,812
1920	5,079	3,104	3,482	2,590	3,585	3,566	2,644	2,191	1,988	2,487	3,329	3,985	38,019
1921	4,347	3,799	3,047	3,003	3,274	3,618	2,821	2,530	2,422	2,866	3,447	3,807	38,982
1922	3,985	3,480	3,350	2,946	3,716	4,046	3,104	2,888	2,747	3,332	4,318	5,201	43,114
1923	5,134	4,231	4,838	4,179	4,325	4,303	3,983	3,556	3,212	4,328	5,341	5,904	53,334
1924	5,911	5,006	4,536	4,073	4,278	4,288	4,114	3,070	2,857	3,498	4,641	6,600	52,873
1925	5,979	4,447	3,299	3,037	3,186	3,732	2,819	2,452	2,598	3,314	3,646	4,533	43,043
1926	4,501	3,351	3,562	3,105	3,131	3,430	3,127	2,834	2,616	2,976	3,610	4,394	40,636
1927	4,514	3,395	3,837	3,330	3,766	4,253	3,431	3,050	2,534	2,969	3,688	4,869	43,633
1928	5,479	5,780	5,140	3,446	3,885	4,078	2,984	2,545	2,508	3,713	4,455	5,782	49,795
1929	5,738	4,478	3,645	3,761	3,798	3,756	3,597	3,130	3,104	3,857	4,499	5,083	48,445

Bureau of Animal Industry.

[1] The figures include rejected carcasses.

TABLE 384.—*Hogs, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, 1923–1929*

Year and month	Source of supply		Sex classification			Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)			
	Stockyards	Other	Sows	Barrows	Stags and boars				Lard[1]	Edible offal	Trimmings	Inedible grease[1]
	P. ct.	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*Dollars*	*Pounds*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*	*P. ct.*
1923	76.07	23.93	52.42	46.86	0.72	7.59	225.33	76.72	16.49	2.14	4.53	1.37
1924	77.95	22.05	52.34	46.96	.70	8.04	222.31	75.33	16.45	2.18	4.59	1.35
1925	75.99	24.01	52.73	46.65	.62	11.79	225.50	75.67	15.04	2.49	5.08	1.29
1926	72.85	27.15	51.58	47.78	.64	12.47	235.06	76.42	15.89	2.69	5.50	1.31
1927	67.63	32.37	50.31	49.10	.59	10.06	233.33	76.27	15.36	2.73	5.64	1.22
1928	64.56	35.44	51.38	48.04	.58	9.20	229.26	75.41	15.40	2.98	5.53	1.19
1929	59.79	40.21	51.76	47.68	.56	10.08	231.72	75.32	15.75	3.17	6.24	1.18
1929												
January	58.74	41.26	47.15	52.48	.37	9.00	225.41	75.50	16.57	3.21	5.42	1.16
February	57.04	42.96	46.53	53.08	.39	9.96	227.89	75.67	16.21	3.05	6.16	1.15
March	60.20	39.80	48.04	51.41	.55	11.22	229.47	76.23	16.06	3.12	5.93	1.20
April	62.31	37.69	49.75	49.37	.88	11.17	229.82	76.06	16.01	2.99	6.63	1.20
May	61.38	38.62	50.70	48.51	.79	10.77	232.34	75.70	16.14	3.20	6.25	1.20
June	60.38	39.62	52.72	46.60	.68	10.58	239.59	75.01	16.08	3.09	6.62	1.19
July	62.04	37.96	60.57	38.79	.64	11.09	250.01	75.42	15.59	3.19	6.47	1.21
August	61.47	38.53	60.12	39.30	.58	10.65	249.35	75.40	15.68	3.18	6.38	1.20
September	63.66	36.34	57.48	42.02	.50	10.01	238.34	74.93	15.49	3.26	6.77	1.20
October	62.21	37.79	53.65	45.81	.54	9.43	228.76	74.05	14.65	3.23	6.58	1.18
November	57.40	42.60	51.54	47.90	.56	9.01	220.12	74.76	14.68	3.30	6.32	1.14
December	54.80	45.20	49.75	49.77	.48	9.22	223.64	75.09	15.58	3.16	5.84	1.16

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Rendered.

NOTE.—A table similar to Table 388, 1928 Yearbook, hogs—livestock and meat situation, is omitted.

TABLE 385.—*Hogs: Slaughter in specified countries, average pre-war and annual, 1914–1928*

Year	United States, Federal inspected	Germany, inspected slaughter	Denmark, in export slaughterhouses	England and Wales, sold off farms for slaughter [1]	Scotland, sold off farms for slaughter [1]	Ireland, purchased by Irish bacon curers	Canada	Netherland receipts at 21 markets
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Average pre-war [2]	31, 759	16, 406	2, 503	3, 487	----------	1, 282	4, 280	875
1914	32, 532	(3)	2, 858	----------	----------	----------	----------	1, 085
1915	38, 381	(3)	2, 594	----------	----------	----------	----------	842
1916	13, 084	(3)	2, 542	----------	----------	----------	----------	850
1917	33, 910	(3)	2, 479	----------	----------	----------	----------	600
1918	41, 214	(3)	324	----------	----------	----------	----------	217
1919	41, 812	1, 368	456	----------	----------	874	5, 526	422
1920	38, 019	3, 024	930	2, 700	146	898	4, 834	648
1921	38, [illegible]82	6, 825	1, 641	3, 471	173	1, 030	5, 297	1, 362
1922	43, 114	6, 923	2, 215	3, 229	176	926	5, 382	865
1923	53, 334	5, 830	3, 414	3, 691	245	955	6, 056	906
1924	52, 873	10, 527	4, 024	4, 500	242	1, 110	6, 625	1, 068
1925	43, 013	12, 090	3, 766	3, 588	----------	911	5, 720	1, 045
1926	40, 636	13, 072	3, 838	3, 074	----------	910	5, 636	1, 025
1927	43, 633	17, 279	5, 098	3, 680	----------	1, 050	5, 965	1, 151
1928	49, 795	19, 391	5, 373	4, 112	----------	----------	5, 880	----------

Bureau of Agricultural Economics. Compiled from official sources and cabled reports from agricultural commissioners abroad.

[1] For years ended May 31 following.
[2] Average for 5 years immediately preceding war period if available, otherwise for any year or years within that period unless otherwise stated. In countries having changed boundaries, the figures are estimates for 1 year only for numbers within present boundaries.
[3] Not available for present boundaries. For former boundaries, the numbers slaughtered are as follows in thousands—1914, 19,441; 1915, 13,293; 1916, 6,548; 1917, 5,795; 1918, 2,430.

TABLE 386.—*Lard: Total stocks in cold-storage warehouses and meat-packing establishments, United States, 1916–1929* [1]

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1916	63, 304	92, 342	111, 897	97, 237	108, 731	85, 113	87, 127	95, 991	82, 028	71, 570	56, 929	58, 950
1917	80, 977	86, 208	88, 460	65, 179	61, 640	72, 365	95, 197	112, 249	102, 172	69, 929	37, 095	44, 367
1918	54, 539	59, 310	65, 355	89, 854	103, 373	106, 194	107, 871	102, 411	104, 668	90, 398	76, 124	81, 676
1919	104, 274	138, 353	125, 410	112, 469	112, 409	83, 096	92, 132	100, 478	87, 947	76, 456	66, 036	49, 147
1920	62, 614	97, 649	111, 975	132, 993	141, 819	152, 307	193, 316	191, 531	170, 774	109, 258	47, 329	36, 683
1921	59, 319	83, 549	117, 690	128, 614	152, 428	181, 992	204, 301	194, 490	149, 886	85, 115	48, 850	42, 001
1922	47, 541	61, 202	61, 297	86, 031	96, 055	123, 798	154, 254	143, 084	119, 755	75, 338	36, 750	32, 506
1923	48, 808	56, 266	59, 101	66, 743	85, 251	84, 530	123, 896	143, 579	115, 860	72, 608	35, 225	35, 327
1924	49, 340	54, 130	68, 610	85, 722	102, 317	127, 949	152, 520	149, 672	124, 676	84, 198	31, 706	35, 713
1925	61, 049	112, 704	151, 927	150, 182	151, 499	138, 295	145, 919	145, 924	114, 724	71, 626	37, 256	33, 710
1926	42, 478	64, 187	76, 145	93, 108	98, 365	106, 824	120, 527	153, 572	151, 233	105, 558	72, 355	46, 744
1927	49, 992	69, 576	77, 103	92, 069	99, 611	111, 976	147, 318	179, 136	167, 018	118, 174	72, 121	46, 154
1928	54, 855	84, 007	121, 082	164, 506	173, 088	186, 073	214, 479	204, 939	177, 888	126, 890	83, 474	67, 257
1929	85, 217	140, 526	173, 864	179, 428	184, 748	183, 490	199, 699	203, 010	180, 085	153, 690	99, 854	68, 517

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] Lard includes all prime steam, kettle-rendered, neutral, and other pure lards. It does not include lard substitutes nor compounds.

TABLE 387.—*Pork: Stocks in cold-storage warehouses and meat-packing establishments, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
DRY SALT CURED, AND IN PROCESS OF CURE												
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1916	145, 661	194, 053	226, 910	206, 703	202, 392	206, 008	202, 088	205, 251	183, 194	140, 908	118, 958	142, 858
1917	200, 998	228, 424	259, 059	234, 396	219, 819	213, 802	224, 813	231, 905	195, 678	143, 319	110, 652	150, 882
1918	252, 934	341, 422	402, 734	448, 114	471, 809	493, 795	402, 549	370, 203	333, 472	283, 572	247, 194	283, 002
1919	357, 254	471, 747	435, 661	430, 205	425, 411	402, 652	381, 736	366, 547	338, 270	332, 786	281, 930	242, 224
1920	262, 620	332, 848	402, 229	457, 745	462, 389	430, 782	408, 681	381, 328	316, 433	233, 389	150, 812	114, 400
1921	144, 997	202, 909	251, 893	255, 390	246, 443	240, 610	250, 752	231, 511	200, 291	149, 974	108, 611	96, 731
1922	111, 071	128, 690	139, 281	145, 183	142, 030	157, 689	186, 948	179, 856	165, 668	122, 783	85, 671	83, 017
1923	121, 125	155, 922	178, 024	206, 429	227, 728	214, 453	217, 862	221, 716	191, 711	146, 974	108, 850	110, 824
1924	148, 121	167, 507	178, 258	192, 934	191, 882	206, 009	212, 158	202, 618	180, 127	135, 702	81, 460	78, 871
1925	118, 718	136, 125	150, 819	142, 950	145, 548	142, 292	162, 518	164, 374	152, 555	128, 599	106, 011	96, 746
1926	119, 617	138, 005	144, 071	151, 286	140, 324	136, 801	148, 164	168, 882	172, 766	143, 572	98, 521	66, 765
1927	68, 203	86, 135	101, 156	124, 676	129, 637	143, 143	173, 256	185, 920	178, 107	140, 420	100, 922	77, 240
1928	97, 335	119, 751	160, 609	178, 012	173, 652	169, 663	174, 906	164, 473	156, 462	125, 899	101, 123	102, 440
1929	143, 011	167, 561	179, 776	178, 595	185, 580	171, 450	163, 805	172, 308	160, 519	139, 256	111, 092	88, 782
PICKLED,[1] CURED, AND IN PROCESS OF CURE												
1916	230, 881	298, 939	350, 750	351, 051	337, 464	326, 183	359, 300	350, 570	303, 399	251, 004	209, 061	251, 519
1917	307, 478	348, 269	378, 847	362, 931	381, 236	403, 185	412, 810	403, 704	328, 943	252, 152	192, 884	204, 907
1918	269, 003	322, 004	369, 014	402, 377	406, 191	397, 486	372, 347	365, 941	315, 517	249, 827	223, 148	242, 976
1919	303, 763	392, 260	435, 197	431, 714	434, 671	440, 989	422, 387	384, 764	341, 724	297, 712	239, 719	226, 893
1920	279, 467	337, 238	369, 026	361, 973	353, 864	371, 593	403, 719	389, 896	361, 381	295, 460	254, 838	252, 270
1921	294, 993	316, 328	376, 376	367, 553	355, 041	366, 291	366, 346	346, 623	320, 190	257, 244	212, 528	221, 345
1922	252, 822	284, 487	321, 950	347, 276	348, 305	363, 395	391, 474	385, 692	369, 187	313, 517	278, 812	302, 708
1923	377, 107	412, 806	451, 279	469, 130	499, 119	483, 673	473, 569	449, 441	413, 798	367, 374	325, 456	384, 604
1924	434, 039	468, 892	500, 784	512, 190	500, 683	483, 372	473, 914	443, 918	408, 928	351, 485	283, 710	299, 868
1925	398, 521	443, 025	483, 302	468, 099	467, 395	425, 481	407, 610	373, 227	338, 156	284, 485	256, 684	261, 128
1926	294, 642	319, 726	345, 661	346, 049	338, 905	320, 305	333, 305	340, 687	330, 326	293, 106	257, 726	266, 222
1927	306, 904	352, 681	392, 642	420, 037	435, 967	432, 965	450, 172	440, 744	407, 239	341, 460	289, 553	276, 916
1928	320, 436	370, 916	461, 264	496, 322	480, 069	459, 878	454, 826	408, 994	351, 936	285, 309	265, 988	292, 626
1929	375, 217	424, 921	473, 916	453, 612	452, 868	443, 044	430, 317	412, 649	382, 750	342, 038	304, 400	316, 180
FROZEN												
1916	44, 194	63, 376	88, 604	88, 344	77, 812	83, 195	82, 571	85, 845	63, 420	38, 851	23, 988	32, 015
1917	50, 564	66, 062	63, 352	64, 996	74, 728	77, 534	91, 562	96, 648	72, 286	39, 767	25, 347	23, 504
1918	41, 663	61, 659	104, 630	116, 548	117, 786	118, 601	117, 976	108, 220	71, 385	46, 593	36, 968	34, 750
1919	61, 539	104, 708	128, 897	142, 189	139, 205	144, 212	155, 263	131, 137	90, 510	61, 417	47, 271	44, 864
1920	55, 551	106, 677	132, 095	148, 922	144, 453	156, 963	170, 054	161, 804	129, 197	87, 592	67, 148	60, 007
1921	93, 990	150, 594	208, 889	219, 964	200, 706	194, 486	182, 163	149, 435	103, 486	64, 682	38, 517	37, 513
1922	51, 203	71, 722	86, 219	98, 765	103, 907	114, 571	128, 962	117, 903	84, 815	46, 796	30, 688	33, 774
1923	72, 278	120, 196	154, 377	189, 115	213, 224	210, 645	217, 074	195, 002	148, 753	98, 795	71, 640	82, 068
1924	126, 718	164, 491	199, 044	227, 284	215, 767	201, 728	186, 566	164, 049	121, 816	77, 986	42, 561	48, 781
1925	130, 125	199, 642	231, 234	218, 508	201, 246	180, 645	168, 527	131, 935	93, 078	54, 294	29, 910	27, 153
1926	57, 960	98, 311	120, 115	129, 259	124, 569	117, 366	120, 707	133, 104	119, 994	77, 673	49, 376	55, 241
1927	97, 650	150, 255	177, 876	193, 733	204, 608	211, 742	220, 847	214, 607	181, 072	126, 887	76, 644	65, 666
1928	105, 654	164, 971	264, 043	323, 403	306, 951	289, 825	285, 628	245, 714	173, 617	103, 879	66, 049	66, 696
1929	151, 811	245, 798	291, 050	289, 754	285, 110	256, 291	247, 815	229, 397	176, 131	119, 204	75, 910	84, 667

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] Pickled pork includes sweet-pickled, plain-brine, and barreled pork.

NOTE.—A table similar to Table 392, 1928 Yearbook, wholesale and retail prices of certain pork products, is omitted.

TABLE 388.—*Pork and pork products: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1911–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	171	1,019,561	7,235	1,241,209	9,156	1,130,323	14,524	1,002,690	12,866	1,101,968
Denmark	7,124	298,086	2,826	462,925	2,540	460,191	3,569	616,322	2,735	650,462
Netherlands	88,143	139,916	13,980	259,464	23,811	204,391	13,863	306,312	15,623	274,177
Canada	29,189	47,694	18,821	156,717	18,712	115,821	11,492	87,427	15,227	53,357
Irish Free State	0	0	63,316	78,280	59,676	78,224	52,976	95,045	48,509	115,957
Sweden	6,736	19,445	15,395	17,041	11,498	31,610	7,330	61,255	6,863	51,426
Poland	0	0	26,339	57,735	17,385	39,864	40,318	38,388	57,292	46,987
China	----	7,679	378	16,717	307	14,492	595	10,801	442	10,089
Hungary	0	0	254	32,485	63	54,685	19	20,576	86	10,605
New Zealand	248	1,049	139	5,784	17	8,659	9	12,764	6	18,893
Australia [1]	[2] 923	[2] 6,294	1,397	3,249	1,220	3,720	1,683	3,631	----	----
Argentina	1,977	9	50	1,416	55	12,584	232	8,266	----	10,591
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	875,929	15,820	1,373,856	6,162	1,297,155	5,381	1,358,270	6,186	1,416,466	6,256
Germany	265,669	3,532	412,163	2,819	385,273	4,071	296,743	5,039	240,873	4,832
Cuba	85,973	0	137,214	0	131,104	0	129,019	0	----	----
France	59,824	24,668	57,277	3,334	60,785	3,638	162,736	3,734	102,021	3,225
Czechoslovakia	0	0	84,353	4,277	88,871	3,977	75,439	3,772	71,630	3,285
Austria	[3] 14,338	[3] 3,343	47,504	575	21,152	1,200	27,789	907	31,093	404
Belgium	22,232	16,254	12,602	3,043	15,755	12,034	17,398	10,100	19,733	6,815
Italy	74,861	----	13,360	1,502	5,444	8,662	6,489	3,606	30,147	1,108
Norway	9,751	26	13,619	6	8,256	9	4,516	7	8,286	----
Finland	----	----	9,312	895	14,334	373	11,256	115	13,848	181
Peru	----	----	12,848	0	14,742	0	11,999	18	----	----
Switzerland	21,976	105	6,550	819	6,594	34	6,657	23	6,496	37
Philippine Islands	4,414	0	5,823	0	6,174	0	7,516	0	7,359	0
Spain	553	641	975	1,790	474	2,972	2,931	----	----	----
Union of South Africa	8,249	30	1,567	96	1,076	1,514	1,272	222	1,416	115
Brazil	3,767	278	9,746	312	1,281	594	500	260	----	46
Chile	3,195	9	511	259	830	5	----	----	----	----
Total, 29 countries	1,585,242	1,604,439	2,358,410	2,358,911	2,203,740	2,199,028	2,267,140	2,297,466	2,109,017	2,370,816

Bureau of Agricultural Economics. Official sources.

[1] Year ended June 30. [2] Year ended December 31. [3] Average for Austria-Hungary.

TABLE 389.—*Lard, refined: Average price per 100 pounds, Chicago, by months, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1920	------	23.14	22.93	22.71	22.75	22.98	21.71	21.16	22.58	23.28	22.07	18.15	22.25
1921	16.03	14.91	14.48	13.07	11.88	12.03	13.94	13.65	13.51	12.16	11.62	11.25	13.21
1922	11.19	12.59	13.50	12.62	13.15	13.22	13.06	13.30	13.00	14.12	13.78	13.31	13.07
1923	13.20	13.25	13.87	13.42	13.12	13.18	12.84	12.83	15.06	15.22	15.72	15.04	13.90
1924	14.52	13.03	12.84	12.50	12.19	12.13	13.65	15.94	16.25	18.05	16.68	18.00	14.65
1925	17.59	17.03	18.25	17.07	16.50	18.13	18.42	18.94	18.95	18.75	18.50	16.67	17.90
1926	16.81	16.44	16.70	16.75	17.13	18.48	18.00	17.38	17.50	16.75	15.75	15.25	16.91
1927	13.59	13.72	14.38	14.32	14.12	13.35	12.25	12.54	14.25	14.50	13.60	13.25	13.66
1928	12.50	11.60	11.50	12.50	13.10	13.50	14.00	14.70	15.25	14.40	13.62	12.88	13.30
1929	12.75	12.75	13.31	13.25	12.85	12.85	13.22	13.56	13.81	13.17	12.21	11.94	12.97

Bureau of Agricultural Economics. Compiled from data of the livestock and meat reporting service of the bureau. Prices, 1905 to January, 1920, compiled from the National Provisioner, available in 1927 Yearbook, p. 1018.

TABLE 390.—*Lard, American prime western steam: Average price per pound in Liverpool, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	32.0	29.5	32.9	27.2	------	27.4	26.7	------	------	------	23.8	24.2	------
1921	23.4	[1]23.3	15.7	13.2	11.7	12.1	13.6	13.4	13.2	12.2	12.6	11.7	14.7
1922	11.3	12.9	13.1	12.8	13.6	13.5	13.2	13.3	12.7	13.2	14.1	13.6	13.1
1923	13.3	13.0	13.7	13.6	12.9	13.0	12.7	12.7	14.0	14.5	15.7	15.1	13.7
1924	14.8	13.1	12.8	12.7	12.3	12.2	13.7	15.8	15.8	18.1	17.2	18.1	14.7
1925	18.0	17.5	18.7	17.8	17.6	19.1	19.3	19.2	19.2	17.9	17.8	16.6	18.2
1926	17.2	16.5	16.5	16.0	17.6	18.4	17.8	17.0	16.6	15.8	14.2	14.3	16.5
1927	14.3	14.4	14.4	14.3	14.1	14.4	14.3	13.8	14.6	14.4	14.0	13.5	14.2
1928	13.6	12.9	13.0	13.3	13.4	13.3	13.7	13.9	14.4	13.9	13.4	13.2	13.5
1929	13.4	13.5	13.9	13.5	13.4	13.5	13.9	13.8	13.5	12.7	12.1	11.8	13.2

Bureau of Agricultural Economics. Compiled from Manchester Guardian. An average of Friday quotations. Converted at monthly average rate of exchange as given in Federal Reserve Bulletins to 1925, inclusive; subsequently at par of exchange.

[1] Government control of prices ended on Feb. 28, 1921.

TABLE 391.—*Bacon, Wiltshire sides,[1] green, firsts: Average price per pound at Bristol, England, 1909–1929*

Year and month	American	Canadian	Danish	Irish	British	Year and month	American	Canadian	Danish	Irish	British
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	1928	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1909	13.6	14.3	15.0	15.9	16.7	January	16.5	------	18.3	21.9	26.5
1910	15.2	15.6	15.9	16.6	17.8	February	16.4	------	18.5	22.6	26.5
1911	12.8	13.1	14.3	14.8	15.8	March	16.1	------	18.6	23.1	26.8
1912	13.8	14.5	15.9	15.8	16.3	April	16.2	------	18.9	24.1	27.6
1913	15.8	16.3	17.1	17.4	18.4	May	15.6	------	20.2	24.8	26.9
1914	15.5	15.7	16.4	17.6	18.2	June	16.4	------	23.2	25.3	26.5
1915	17.0	18.4	20.4	20.8	21.4	July	20.6	------	24.3	25.2	26.4
1916	19.8	22.0	24.0	24.7	26.0	August	20.9	------	24.3	25.2	26.5
1917	30.1	------	------	33.0	33.6	September	20.3	------	23.9	24.8	25.4
1918	38.5	------	------	------	30.3	October	19.5	------	20.8	22.0	23.0
1919	37.1	37.9	------	38.4	38.4	November	18.4	------	20.3	21.9	23.1
1920	31.6	33.1	34.2	41.7	42.8	December	18.5	------	22.6	23.0	24.8
1921	21.8	26.5	32.8	34.7	36.2						
1922	21.2	25.2	29.7	32.5	33.3	1929					
1923	17.5	20.9	23.6	25.8	27.0	January	17.4	------	21.1	22.8	25.3
1924	16.6	19.2	21.3	22.8	23.5	February	17.4	------	22.9	25.0	28.1
1925	23.0	24.7	27.5	29.7	30.0	March	23.9	------	24.7	26.8	29.4
1926	------	------	27.8	30.6	32.3	April	25.2	------	27.2	30.1	31.0
1927	------	------	21.1	25.5	26.9	May	------	------	25.2	28.2	30.0
1928	17.9	------	21.2	23.7	25.8	June	21.8	------	24.7	28.2	29.2
1929	------	------	24.5	26.6	28.3	July	23.5	------	27.2	28.8	30.0
						August	23.8	------	27.4	28.2	30.0
						September	21.1	------	23.6	24.5	26.5
						October	22.8	------	23.5	24.3	26.1
						November	------	------	23.2	25.4	26.6
						December	------	------	23.9	26.1	27.8

Bureau of Agricultural Economics. Compiled from Agricultural Market Report, Ministry of Agriculture and Fisheries, Great Britain. Average for the last week of each month 1909–1923. Average of weekly averages 1924–1929. Converted at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par of exchange.

[1] Entire half of hog in one piece, head off, backbone out, ribs in.

NOTE.—A table similar to Table 396, 1928 Yearbook, British pork prices, is omitted.

TABLE 392.—*Hogs: Cholera-control work by Bureau of Animal Industry, 1919–1929*

Year ended June 30, and State	Bureau veterinarians engaged in work [1]	Premises investigated	Demonstrations		Autopsies performed	Farms quarantined or carded	Farms cleaned and disinfected	Outbreaks reported
			Number	Hogs treated				
1919	180	93, 512	----------	233, 987	53, 586	9, 564	4, 382	12, 336
1920	140	46, 145	3, 037	347, 702	10, 963	6, 129	2, 099	9, 788
1921	54	29, 433	3, 420	67, 295	3, 888	2, 268	656	7, 951
1922	80	47, 137	4, 343	88, 846	5, 390	1, 401	439	7, 920
1923	71	52, 348	5, 234	108, 562	5, 247	1, 772	741	7, 204
1924	45	29, 443	3, 178	78, 007	3, 686	1, 634	847	7, 225
1925	34	24, 060	2, 353	51, 331	2, 383	886	470	3, 437
1926	35	20, 599	2, 579	69, 230	2, 446	854	247	4, 558
1927	36. 96	25, 004	4, 863	97, 917	3, 741	1, 832	744	11, 555
1928	38. 42	25, 156	4, 444	106, 906	3, 368	1, 117	522	6, 941
1929								
Alabama	1	1, 376	36	486	23	----------	----------	8
Arkansas	1. 5	1, 006	93	1, 110	41	----------	17	875
California	. 25	75	6	518	49	5	----------	41
Colorado	. 25	100	1	38	50	----------	----------	13
Florida	1. 25	985	652	12, 793	84	----------	----------	240
Georgia	1. 3	1, 123	164	3, 111	94	----------	----------	311
Idaho	1	879	21	749	64	29	7	31
Illinois	3	2, 211	22	886	723	313	393	962
Indiana	2	1, 046	1	250	207	30	----------	146
Iowa	2	645	10	721	198	----------	----------	504
Kansas	1	1, 374	12	126	46	----------	----------	39
Kentucky	2	2, 232	102	5, 930	200	9	10	179
Louisiana	1	400	35	1, 239	31	----------	----------	60
Maryland	2	2, 928	26	614	195	652	3	956
Michigan	2	581	30	1, 586	146	----------	1	298
Mississippi	1. 03	1, 819	290	3, 304	25	----------	----------	23
Missouri	1	943	22	898	107	----------	----------	312
Nebraska	. 5	509	----------	----------	216	----------	----------	86
North Carolina	2	1, 169	227	4, 349	125	166	26	89
Ohio	1	468	11	665	69	----------	----------	258
Oklahoma	2	1, 904	21	1, 043	107	86	----------	167
South Carolina	1	660	652	10, 516	27	----------	----------	591
South Dakota	1	374	----------	----------	77	----------	----------	69
Tennessee	1	877	50	1, 324	78	99	16	143
Texas	. 83	656	1	50	9	----------	----------	145
Virginia	1	894	28	840	96	----------	9	157
Washington	1	721	1	240	56	14	----------	44
Oregon	. 5	137	16	522	9	8	4	21
West Virginia	1	440	57	995	63	10	----------	183
Wisconsin	1	406	61	1, 132	111	60	3	78
Total	37. 41	28, 939	2, 648	56, 023	3, 326	1, 481	489	7, 029

Bureau of Animal Industry.

[1] Fractions in the number of veterinarians engaged denote part time devoted to hog-cholera-control work.

TABLE 393.—*Hogs: Shipments and slaughter, by States, average 1924–1928, annual, 1928*

State and division	Average 1924–1928 [1]						1928 [1]					
	Shipments and local slaughter		In shipments, stocker, feeder, and breeding		Farm slaughter		Shipments and local slaughter		In shipments, stocker, feeder, and breeding		Farm slaughter	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*1,000 pounds*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 pounds*
Maine	35	257	0.4	100	41	258	39	10,140	1	100	42	11,340
New Hampshire	8	256	.8	100	13	258	8	2,080	1	100	14	3,780
Vermont	27	252	------	------	38	250	37	9,250	------	------	43	10,750
Massachusetts	50	257	2	100	42	254	76	19,760	3	300	45	11,700
Rhode Island	4	250	------	------	3	250	4	1,000	------	------	3	750
Connecticut	5	255	------	------	20	254	7	1,820	------	------	23	5,980
New York	110	245	3	100	302	250	133	30,590	6	600	300	70,500
New Jersey	42	200	11	125	42	247	44	8,800	17	2,125	45	11,250
Pennsylvania	407	230	3	100	524	260	440	101,200	3	300	550	143,000
North Atlantic	688	235	20	114	1,024	255	788	184,640	31	3,525	1,065	269,050
Ohio	2,663	220	30	110	658	258	2,620	589,500	6	660	673	168,250
Indiana	3,604	226	51	120	576	254	4,012	922,760	33	3,960	580	145,000
Illinois	5,648	235	60	105	680	250	5,939	1,414,482	41	4,715	680	170,000
Michigan	892	203	25	104	272	240	849	166,404	17	1,955	264	59,400
Wisconsin	2,090	217	2	100	448	233	2,022	444,840	2	200	470	105,750
Minnesota	4,643	225	49	107	380	240	4,520	1,172,600	41	4,510	380	91,200
Iowa	12,049	237	107	106	518	250	12,820	3,013,400	100	11,500	500	120,000
Missouri	4,346	217	43	92	820	244	4,825	1,085,625	47	5,170	850	212,500
North Dakota	805	226	.8	100	218	238	743	170,890	------	------	218	50,140
South Dakota	2,973	226	8	109	164	239	3,156	725,880	12	1,380	170	39,950
Nebraska	5,582	246	79	110	272	251	5,968	1,486,272	165	18,975	275	67,375
Kansas	2,641	222	27	108	353	252	2,751	646,485	55	6,325	360	91,800
North Central	47,935	230	483	107	5,357	247	50,225	11,839,138	519	59,350	5,420	1,321,365
Delaware	17	190	------	------	17	192	20	3,800	------	------	16	3,200
Maryland	78	160	------	------	154	231	119	19,040	------	------	145	34,800
Virginia	235	197	2	100	484	216	200	42,600	3	300	556	133,440
West Virginia	89	170	2	102	202	220	129	21,450	1	100	210	52,500
North Carolina	145	200	------	------	907	228	201	40,200	------	------	935	205,700
South Carolina	144	200	------	------	432	208	90	18,000	------	------	445	97,900
Georgia	416	150	.4	100	997	220	510	76,500	------	------	1,040	228,800
Florida	260	131	------	------	321	146	246	34,440	------	------	335	46,900
South Atlantic	1,383	167	4	101	3,514	214	1,515	256,030	4	400	3,682	803,240
Kentucky	707	190	9	75	620	250	783	138,975	5	375	645	161,250
Tennessee	493	186	7	125	795	212	532	102,730	5	625	810	186,300
Alabama	153	186	1	150	720	230	231	39,560	1	150	735	147,000
Mississippi	110	150	.8	130	618	200	105	15,750	2	280	680	136,000
Arkansas	202	150	2	100	659	200	250	37,500	6	600	668	133,600
Louisiana	118	170	4	119	331	160	95	14,250	6	600	321	51,360
Oklahoma	610	204	12	82	441	252	848	173,636	14	1,260	379	94,750
Texas	621	211	21	100	777	254	734	154,555	13	1,300	800	208,000
South Central	3,014	192	56	98	4,960	223	3,578	676,956	52	5,190	5,038	1,118,260
Montana	246	200	1	100	122	220	233	46,600	------	------	124	27,280
Idaho	327	190	.6	117	66	247	317	60,230	1	100	70	16,450
Wyoming	105	182	.8	100	32	234	132	25,080	1	100	35	8,050
Colorado	498	226	8	100	88	240	500	113,425	15	1,500	90	20,790
New Mexico	38	200	.4	100	31	234	40	8,000	------	------	30	6,000
Arizona	18	200	.2	100	10	198	19	3,800	------	------	10	1,900
Utah	52	164	2	100	47	200	81	12,150	3	300	45	9,000
Nevada	29	173	------	------	12	200	33	5,910	------	------	16	3,200
Washington	163	210	17	100	106	228	193	40,855	20	2,000	110	24,200
Oregon	240	200	17	125	98	218	279	55,921	17	2,125	108	22,680
California	592	187	4	100	112	209	753	138,540	5	500	120	24,600
Far Western	2,307	200	50	109	722	223	2,580	510,511	62	6,625	758	164,150
United States	55,326	225	614	107	15,579	231	58,686	13,467,275	668	75,090	15,963	3,676,065

Bureau of Agricultural Economics. Estimates division crop and livestock estimates.

[1] Preliminary.

TABLE 394.—*Hogs: Value of production and income, average 1924–1928, annual, 1928*

State	Average 1924–1928 [1]				1928 [1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	568	1, 656	2, 224	2, 055	544	1, 621	2, 165	1, 876
New Hampshire	168	451	619	616	162	415	577	536
Vermont	434	1, 308	1, 743	1, 586	460	1, 515	1, 975	1, 730
Massachusetts	582	2, 107	2, 689	2, 601	562	2, 593	3, 155	2, 918
Rhode Island	40	152	192	173	40	159	199	187
Connecticut	292	486	778	704	320	572	892	783
New York	4, 435	7, 476	11, 912	10, 682	3, 761	6, 900	10, 661	8, 981
New Jersey	712	1, 362	2, 074	1, 906	700	1, 231	1, 931	1, 665
Pennsylvania	10, 020	16, 353	26, 373	23, 845	9, 389	15, 896	25, 285	21, 883
North Atlantic	17, 252	31, 352	48, 604	44, 168	15, 938	30, 902	46, 840	40, 559
Ohio	15, 146	61, 905	77, 051	74, 272	13, 321	56, 161	69, 482	63, 862
Indiana	13, 969	82, 301	96, 270	93, 938	12, 244	84, 567	96, 811	91, 052
Illinois	15, 116	130, 836	145, 953	142, 740	13, 311	124, 502	137, 813	130, 989
Michigan	4, 212	20, 487	24, 699	22, 948	3, 444	17, 049	20, 493	17, 938
Wisconsin	7, 954	45, 658	53, 612	52, 407	7, 191	40, 128	47, 319	43, 514
Minnesota	7, 153	98, 626	105, 780	105, 081	6, 510	98, 262	104, 772	99, 552
Iowa	12, 211	269, 584	281, 795	277, 118	9, 996	255, 254	265, 250	253, 492
Missouri	17, 638	92, 365	110, 002	108, 461	16, 630	94, 980	111, 610	108, 364
North Dakota	4, 227	16, 952	21, 179	20, 520	3, 650	14, 140	17, 790	16, 962
South Dakota	3, 441	62, 066	65, 507	63, 930	3, 055	58, 510	61, 565	56, 680
Nebraska	6, 189	126, 161	132, 351	130, 492	5, 385	120, 838	126, 223	118, 168
Kansas	8, 016	56, 421	64, 437	63, 706	7, 342	55, 678	63, 020	61, 946
North Central	115, 273	1, 063, 363	1, 178, 636	1, 155, 611	102, 079	1, 020, 069	1, 122, 148	1, 062, 519
Delaware	227	534	761	706	193	537	730	665
Maryland	3, 061	2, 242	5, 304	5, 055	2, 762	2, 708	5, 470	5, 012
Virginia	8, 904	7, 033	15, 936	15, 160	10, 300	6, 673	16, 973	15, 586
West Virginia	3, 682	2, 835	6, 517	5, 575	4, 023	3, 460	7, 483	6, 800
North Carolina	18, 779	7, 319	26, 098	24, 376	19, 009	8, 342	27, 351	23, 527
South Carolina	8, 525	3, 518	12, 043	10, 935	8, 834	2, 461	11, 295	10, 589
Georgia	17, 944	8, 228	26, 171	25, 000	16, 226	8, 372	24, 598	22, 363
Florida	2, 440	5, 008	7, 448	6, 841	2, 111	4, 412	6, 523	5, 877
South Atlantic	63, 563	36, 716	100, 278	93, 648	63, 458	36, 965	100, 423	90, 419
Kentucky	13, 443	15, 717	29, 161	27, 649	12, 275	14, 506	26, 781	24, 073
Tennessee	13, 948	11, 587	25, 535	23, 796	13, 298	11, 280	24, 578	22, 145
Alabama	12, 672	5, 108	17, 780	17, 127	9, 608	5, 026	14, 634	13, 299
Mississippi	8, 849	3, 892	12, 741	11, 891	8, 476	3, 590	12, 066	10, 238
Arkansas	8, 950	5, 047	13, 997	13, 509	8, 326	5, 171	13, 497	11, 871
Louisiana	3, 694	2, 790	6, 484	5, 973	3, 328	2, 098	5, 426	4, 981
Oklahoma	9, 394	11, 700	21, 093	20, 528	7, 214	14, 542	21, 756	20, 260
Texas	16, 061	14, 503	30, 565	29, 231	14, 643	14, 836	29, 479	27, 218
South Central	87, 011	70, 344	157, 356	149, 703	77, 168	71, 049	148, 217	134, 085
Montana	1, 852	5, 237	7, 089	6, 999	1, 721	4, 574	6, 295	6, 601
Idaho	1, 362	6, 185	7, 547	7, 336	1, 217	5, 427	6, 644	6, 078
Wyoming	547	1, 802	2, 349	2, 403	535	2, 173	2, 708	2, 814
Colorado	1, 662	10, 846	12, 508	12, 329	1, 501	10, 115	11, 616	11, 703
New Mexico	518	789	1, 307	1, 279	398	747	1, 145	1, 074
Arizona	122	453	575	543	126	495	621	598
Utah	687	1, 062	1, 749	1, 729	595	1, 270	1, 865	1, 804
Nevada	200	570	770	758	237	588	825	804
Washington	1, 435	4, 858	6, 293	6, 005	1, 291	4, 992	6, 283	5, 752
Oregon	1, 272	5, 733	7, 005	6, 785	1, 231	6, 031	7, 262	6, 836
California	1, 840	12, 759	14, 599	14, 342	1, 718	14, 250	15, 968	15, 808
Far Western	11, 499	50, 292	61, 791	60, 508	10, 570	50, 662	61, 232	59, 872
United States	294, 598	1, 252, 067	1, 546, 665	1, 503, 639	269, 213	1, 209, 647	1, 478, 860	1, 387, 454

Bureau of Agricultural Economics. Estimates division crop and livestock estimates.

[1] Preliminary.

TABLE 395.—*Sheep: Number and value per head in the United States, 1840, 1850, 1860, 1867–1929*

Year	On farms: Number [1]	On farms: Value per head Jan. 1	On farms and elsewhere Jan 1 [2]
	Thousands	*Dollars*	*Thousands*
1840 [3]	*19,311*		
1850 [3]	*21,723*		29,100
1860 [3]	*22,471*		27,600
1867	39,385	2.50	38,100
1868	38,992	1.82	37,600
1869	37,724	1.64	36,200
1870 [3]	*28,478*		
1870	40,853	1.96	39,000
1871	31,851	2.14	38,900
1872	31,679	2.61	38,600
1873	33,002	2.71	40,100
1874	33,938	2.43	41,100
1875	33,784	2.55	40,800
1876	35,935	2.37	43,300
1877	35,804	2.13	43,000
1878	35,740	2.21	42,800
1879	38,124	2.07	45,500
1880 [3]	*35,192*		
1880	40,766	2.21	48,500
1881	43,570	2.39	51,200
1882	45,016	2.37	52,300
1883	49,237	2.53	56,600
1884	50,627	2.37	57,500
1885	50,360	2.14	56,500
1886	48,322	1.91	53,600
1887	44,759	2.01	49,100
1888	43,545	2.05	47,200
1889	42,599	2.13	45,700
1890 [3]	*35,935*		
1890	44,336	2.27	47,000
1891	43,431	2.50	46,400
1892	44,938	2.58	48,400
1893	47,274	2.66	51,300
1894	45,048	1.98	49,300
1895	42,294	1.58	46,700
1896	38,299	1.70	42,600
1897	36,819	1.82	41,300
1898	37,657	2.46	42,600
1899	39,114	2.75	44,600
1900	[4] 41,883	2.93	48,100
1900 [3]	*61,504*		
1900	44,573		44,804
1901	46,155	2.98	46,395
1902	46,667	2.65	46,910
1903	45,180	2.63	45,415
1904	42,439	2.59	42,660
1905	40,268	2.82	40,477
1906	42,454	3.54	42,675
1907	44,518	3.84	44,749
1908	46,557	3.88	46,799
1909	48,382	3.43	48,634
1910 [3]	*52,448*		
1910	47,072	4.12	47,463
1911	47,349	3.91	47,742
1912	43,279	3.46	43,638
1913	40,700	3.94	41,038
1914	37,773	4.02	38,087
1915	36,287	4.50	36,588
1916	36,543	5.17	36,846
1917	36,700	7.13	37,005
1918	39,000	11.82	39,324
1919	41,000	11.63	41,340
1920 [3]	*35,034*		
1920	40,243	10.46	40,694
1921	38,690	6.28	39,123
1922	36,186	4.80	36,591
1923	36,212	7.53	36,618
1924	36,876	7.91	37,289
1925 [3]	*35,590*		
1925	38,112	9.70	38,539
1926	39,730	10.51	40,175
1927	41,881	9.71	42,350
1928	44,554	10.25	45,053
1929	[5] 47,171	10.60	47,699

Bureau of Agricultural Economics. Later revised figures for 1928, 1929, and preliminary for 1930 may be found in February, 1930, Crops and Markets.

[1] Prior to 1900 estimates for each 10-year period represent an index of annual changes applied to census as base on first report after census data were available. Figures 1900–1919 are tentative revised estimates of the Bureau of Agricultural Economics as first published in 1927 Yearbook.

[2] Data for sheep on farms and elsewhere as of Jan. 1, prior to 1900, estimated by the Bureau of Animal Industry. Census figures prior to 1920 were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Figures from 1900–1929 are the estimates of the Bureau of Agricultural Economics of sheep on farms plus an estimate made by the Bureau of Animal Industry of sheep in towns and villages.

[3] Italic figures are from the census. Figures for census years 1860, 1880, and 1890 exclude an estimated number of unenumerated sheep on ranges, as follows: 1860, 1,505,810; 1880, 7,000,000; 1890, 4,940,948. Censuses prior to 1900 excluded lambs. Census dates were June 1 from 1840 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[4] Original estimate of the Bureau of Agricultural Economics.

[5] Preliminary.

TABLE 396.—*Sheep and lambs: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	89	95	92	92	93	7. 60	8. 00	8. 30	8. 50	8. 40
New Hampshire	18	19	20	21	21	8. 10	8. 60	9. 00	9. 50	9. 60
Vermont	40	43	43	44	45	8. 30	8. 90	9. 40	9. 30	9. 00
Massachusetts	12	11	11	11	11	9. 70	9. 40	9. 80	10. 60	10. 00
Rhode Island	2	2	2	2	2	10. 00	9. 50	10. 00	10. 50	11. 00
Connecticut	8	8	7	8	8	9. 40	10. 20	10. 40	10. 80	11. 90
New York	473	497	477	491	452	10. 60	11. 60	10. 80	11. 10	11. 50
New Jersey	6	6	6	6	6	9. 50	10. 80	11. 80	12. 20	11. 50
Pennsylvania	415	415	400	437	441	8. 80	9. 70	9. 40	9. 50	9. 60
North Atlantic	1, 063	1, 096	1, 058	1, 112	1, 079	9. 52	10. 35	9. 98	10. 16	10. 30
Ohio	1, 941	2, 000	2, 133	2, 133	2, 154	8. 90	9. 50	8. 50	8. 90	9. 00
Indiana	595	647	731	705	726	10. 60	11. 50	10. 10	11. 00	11. 20
Illinois	556	710	800	630	664	10. 40	11. 30	10. 00	10. 60	10. 80
Michigan	1, 066	1, 173	1, 314	1, 314	1, 380	11. 20	12. 00	10. 40	10. 90	11. 00
Wisconsin	360	401	469	430	450	10. 20	11. 00	9. 60	10. 20	10. 40
Minnesota	462	540	628	666	686	10. 60	11. 20	9. 70	10. 50	10. 80
Iowa	870	913	1, 047	939	1, 096	11. 20	11. 80	10. 20	10. 80	11. 00
Missouri	894	940	986	942	987	9. 40	10. 00	9. 70	10. 10	10. 60
North Dakota	311	373	460	529	582	9. 90	11. 20	10. 20	10. 70	11. 00
South Dakota	682	700	749	809	890	10. 50	10. 80	9. 90	10. 60	10. 50
Nebraska	780	810	684	905	1, 050	10. 50	10. 30	8. 70	9. 10	9. 50
Kansas	384	452	475	512	538	9. 10	9. 80	9. 40	9. 40	9. 20
North Central	8, 901	9, 659	10, 476	10, 514	11, 203	10. 10	10. 71	9. 59	10. 09	10. 27
Delaware	2	2	2	2	2	10. 00	10. 00	10. 00	12. 00	11. 50
Maryland	92	96	98	101	108	9. 50	10. 40	10. 30	11. 60	11. 50
Virginia	351	362	380	426	469	8. 90	10. 10	10. 30	11. 50	11. 80
West Virginia	485	485	500	565	593	8. 20	9. 40	10. 10	10. 90	11. 00
North Carolina	67	73	80	85	89	6. 20	6. 60	7. 40	9. 00	9. 00
South Carolina	14	13	14	15	15	4. 40	4. 10	4. 90	4. 90	4. 90
Georgia	51	51	51	46	48	3. 40	3. 20	3. 60	3. 80	4. 00
Florida	60	59	59	59	59	3. 30	3. 00	3. 20	3. 60	4. 30
South Atlantic	1, 122	1, 141	1, 184	1, 299	1, 383	7. 90	8. 85	9. 31	10. 38	10. 59
Kentucky	715	751	871	958	996	8. 90	10. 10	10. 70	11. 20	11. 40
Tennessee	292	286	300	345	352	5. 90	7. 40	10. 10	9. 60	9. 60
Alabama	57	48	53	66	79	4. 30	3. 90	3. 70	4. 40	4. 20
Mississippi	114	108	76	45	38	2. 90	3. 00	3. 30	3. 40	3. 30
Arkansas	52	49	54	54	50	3. 90	4. 80	5. 80	6. 10	6. 50
Louisiana	109	105	102	107	110	3. 20	3. 00	3. 00	3. 00	3. 30
Oklahoma	64	70	84	97	107	7. 30	8. 80	9. 20	8. 80	10. 00
Texas	3, 500	3, 535	4, 065	4, 593	5, 052	7. 50	8. 10	7. 80	8. 40	8. 90
South Central	4, 903	4, 952	5, 605	6, 265	6, 784	7. 36	8. 10	8. 23	8. 75	9. 14
Montana	2, 579	2, 880	3, 053	3, 358	3, 761	10. 40	11. 40	10. 50	11. 00	11. 30
Idaho	1, 960	1, 880	1, 974	2, 110	2, 216	10. 90	11. 80	10. 80	11. 40	11. 90
Wyoming	2, 700	2, 870	3, 100	3, 193	3, 448	10. 80	11. 50	10. 20	10. 60	11. 60
Colorado	2, 565	2, 537	1, 938	2, 806	2, 780	10. 30	10. 50	9. 40	9. 70	10. 60
New Mexico	2, 100	2, 050	2, 250	2, 362	2, 362	8. 50	9. 50	8. 70	9. 00	10. 30
Arizona	1, 164	1, 220	1, 230	1, 132	1, 109	8. 20	8. 90	9. 10	9. 50	9. 70
Utah	2, 355	2, 472	2, 650	2, 730	2, 866	11. 30	12. 00	10. 80	11. 20	11. 50
Nevada	1, 100	1, 175	1, 198	1, 234	1, 259	11. 00	11. 70	10. 60	11. 00	10. 80
Washington	516	478	526	552	574	11. 20	12. 10	11. 00	11. 50	12. 00
Oregon	2, 039	2, 120	2, 247	2, 359	2, 501	10. 40	11. 50	10. 40	11. 20	11. 50
California	3, 045	3, 200	3, 392	3, 528	3, 846	9. 20	10. 60	10. 00	11. 40	10. 80
Far Western	22, 123	22, 882	23, 558	25, 364	26, 722	10. 15	11. 04	10. 12	10. 68	11. 12
United States	38, 112	39, 730	41, 881	44, 554	47, 171	9. 70	10. 51	9. 71	10. 25	10. 60

Bureau of Agricultural Economics. Estimates of crop-reporting board. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Sum of total value of classes divided by total number and rounded to nearest dime for States. Division and the United States averages not rounded.
[2] Preliminary.

TABLE 397.—*Sheep: Number in countries having 100,000 and over, average 1909–1913 and 1921–1925, annual 1926–1929*

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
NORTH AMERICA AND WEST INDIES		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Canada	June	2, 208	3, 027	3, 142	3, 263	3, 416	3, 728
United States	January	43, 235	37, 215	39, 730	41, 881	44, 795	47, 509
Mexico	June	[2 3] 3, 424	[4] 1, 362	2, 698			
Guatemala		514	153	148	216	241	
Dominican Republic		(134)	148				
Estimated total [5]		49, 800	42, 200				
SOUTH AMERICA							
Colombia		[6] 246	776	800	771		
Venezuela		177	113				
Ecuador			500	700			[7] 700
Peru			11, 363		[7] 12, 000		
Bolivia	December [8]	1, 750	3, 436	4, 200		4, 152	
Chile		3, 477	4, 332	[9] 4, 094			
Brazil	September	10, 550	[10] 7, 933				
Uruguay		[3 11] 26, 286	[3] 14, 443				[7] 19, 358
Paraguay	December [8]	[13] 600					
Argentina	do	[3 13] 43, 225	[3 14] 36, 209		[7 15] 38, 000		
Falkland Islands		711	649	606	607		
Estimated total [5]		93, 200	80, 400				
EUROPE							
Iceland		589	565	590	600		
England and Wales	June	18, 346	14, 385	16, 859	17, 072	16, 390	16, 103
Isle of Man	do	79	77	90	91	89	
Scotland	do	7, 028	6, 827	7, 203	7, 536	7, 579	7, 498
North Ireland	do	364	456	529	600	624	654
Irish Free State	do	3, 423	2, 804	3, 003	3, 120	3, 264	3, 375
Norway [16]	do	1, 398	1, 380	1, 595	1, 608	1, 654	
Sweden	June–September	1, 205	1, 384		806		
Denmark	July	533	380	233			191
Faroe Islands		112	66				
Holland	May–June	842	668				
Belgium	December [8]	189	126				
France	do	16, 176	9, 777	10, 537	10, 775	10, 693	10, 415
Spain	do	15, 778	19, 229	20, 067	20, 529		
Portugal		[3 17] 3, 073	3, 684		[7] 4, 450	[7] 4, 900	
Italy	March–April	11, 615	12, 014	[7] 12, 350	[7] 12, 500		
Switzerland	April	161	245	169			
Germany	December [8]	4, 988	5, 889	4, 753	4, 080	3, 819	3, 630
Austria	do	301	526	[7 15] 313			[7] 500
Czechoslovakia	do	1, 322	[3 10] 986	861			
Hungary	April	2, 406	1, 661	1, 804	1, 611	1, 566	1, 573
Yugoslavia	January	10, 496	7, 728	7, 933	7, 736	7, 722	[7] 7, 800
Greece	December [8]	5, 884	5, 965	6, 636	6, 951	6, 442	6, 920
Bulgaria	do	8, 551	8, 186		[3] 8, 739	8, 427	7, 986
Rumania	do	11, 128	11, 660	12, 950	13, 582	12, 941	12, 801
Poland	November	4, 473	2, 193		1, 918		
Lithuania		1, 152	1, 314	1, 573	1, 365	1, 468	
Latvia	June	996	1, 240	1, 153	1, 128	1, 090	[7] 900
Estonia	July	486	654	666	667	659	475
Finland	September	1, 330	1, 526	1, 414	1, 368	1, 314	
Russia (European and Asiatic).	Summer	[6] 111, 051	93, 569	113, 865	119, 389	123, 810	([18])
Estimated total, excluding Russia.[5]		134, 400	123, 600				
AFRICA							
Morocco		3, 175	7, 533	9, 250	7, 712	[7] 8, 035	
Algeria	September	8, 757	5, 943	6, 786	5, 083	5, 614	6, 196
Libia (Italian)		996	1, 043				
Tunis	December [8]	705	1, 794	1, 329	2, 172	2, 142	1, 620
French West Africa			3, 742	4, 365	3, 968	4, 037	
French Sudan			2, 173		2, 400	2, 424	
Gold Coast		250	373	325	350	400	
Nigeria			1, 681	1, 809	1, 827	1, 755	
Egypt	September	816	1, 013	1, 144	1, 232	1, 180	
Anglo-Egyptian Sudan			1, 638	2, 000	2, 201	2, 201	
British Somaliland				2, 000	2, 000	3, 000	
Italian Somaliland	March		1, 666			1, 039	855
Eritrea (Italian) [19]		1, 585	1, 701		1, 842		
Kenya Colony	March–June	5, 469	2, 600	2, 756	2, 805	2, 847	
French Cameroon [19]		(200)	287	410	456	441	
Uganda	December [8]	612	386	604	866	911	967

See footnotes at end of table

TABLE 397.—*Sheep: Number in countries having 100,000 and over, average 1909–1913 and 1921–1925, annual 1926–1929*—Continued

Country	Month of estimate	Average 1909–1913 [1]	Average 1921–1925 [1]	1926	1927	1928	1929
AFRICA—continued		*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Belgian Congo		300	304	300	285	270	
British Southwest Africa		555	954	1,069	1,252		
Bechuanaland		358	125	132	152	152	
Union of South Africa	August	30,657	32,561	39,020	40,271	[20] 42,662	
Basutoland		1,369	1,954	2,100	2,149	2,100	
Rhodesia, Southern	December [8]	300	333	349	332	352	
Swaziland		164	62				
Tanganyika Territory [19]		3,596	3,893	4,462	4,779	5,062	
Madagascar		318	110	116	66	142	
Estimated total [5]		73,900	77,700				
ASIA							
Arabia					3,500		
Cyprus	March	279	237	207	260	264	
Turkey, European and Asiatic.		19,713	10,451	12,872	10,166		
Iraq (Mesopotamia) [19]	February		5,270	5,055			
Palestine	March		271	291	243		
Persia			[7] 6,562		[7] 14,280	[7] 15,000	[7] 16,000
Syria and Lebanon			1,797	1,400	1,334		
India, British	December–April	23,164	22,412	23,201	23,237	23,350	
Native States	do	8,038	12,299	11,848	12,353		
China		25,951					[7] 35,000
Philippines	December [8]	96	260	344	369	395	
Dutch East Indies—Java and Madura.	do		915		1,292		
Outer possessions	do		115		121		
Estimated total exclusive of Russia. [5]		111,700	106,900				
OCEANIA							
Australia	December [8]	89,008	85,556	103,563	104,267	100,827	106,000
New Zealand	April	23,996	23,382	24,905	25,649	27,134	29,051
Estimated total [5]		113,000	109,000				
Total countries reporting all periods including Russia:							
Pre-war to 1928 (40). [21]		436,113	398,363	456,886	466,531	473,856	
Pre-war to 1929 (19). [21]		250,242	226,349	254,085	258,039	257,628	267,215
Estimated world total, including Russia. [5]		687,100	633,400				

Bureau of Agricultural Economics. Official sources and International Institute of Agriculture unless otherwise stated. Figures in parentheses are interpolated.

[1] Average for 5-year period if available, otherwise for any year or years within this period except as otherwise stated. In countries having changed boundaries the pre-war figures are estimates for 1 year only of numbers within present boundaries. For the pre-war average the years immediately preceding the war have been used.
[2] Year 1902.
[3] Census figures.
[4] Incomplete.
[5] These totals include countries with less than 100,000 interpolations for a few countries not reporting each year and rough estimates for some others.
[6] Year 1916.
[7] Unofficial.
[8] Estimates for countries reporting as of Dec. 31, are considered as of Jan. 1 of the following year, i. e., figures for number of sheep in France as of Dec. 31, 1925, have been placed in 1926 column.
[9] Year 1925.
[10] Year 1920.
[11] Year 1908.
[12] Year 1915.
[13] June, 1914.
[14] December, 1922.
[15] For Argentine average of range from 36,000,000 to 40,000,000, for Austria average of range from 300,000 to 325,000, and for China average of range from 25,000,000 to 45,000,000.
[16] In rural communities only.
[17] 1906.
[18] Sheep and goats 140,689,000 against 140,102,000 in 1928. Sheep alone in 1928 given as 123,810,000. Economic Life, Aug. 14, 1929.
[19] Goats included.
[20] Number in towns assumed to be same as in 1927, i. e., 162,000 and added for purposes of comparison with preceding yers.
[21] Comparable totals for number of countries indicated. Russia excluded from totals pre-war to 1929 as no 1929 figures are available for sheep alone.

TABLE 398.—*Sheep: Receipts at principal public stockyards and at all public stockyards, 1909–1929*

Year	Chicago	Denver	East St. Louis	Fort Worth	Kansas City	Omaha	South St. Joseph	South St. Paul	Sioux City	Total nine markets [1]	All other stockyards reporting [2]	Total all stockyards reporting [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1909	4,441	634	776	188	1,645	2,167	621	496	78	11,046	-------	-------
1910	5,229	596	736	163	1,841	2,985	560	865	151	13,126	-------	-------
1911	5,736	617	992	187	2,175	2,978	718	712	212	14,327	-------	-------
1912	6,056	777	1,031	284	2,134	2,951	729	628	207	14,797	-------	-------
1913	5,903	620	950	328	2,095	3,222	812	785	271	14,986	-------	-------
1914	5,378	692	749	408	2,002	3,114	830	795	404	14,372	-------	-------
1915	3,510	765	648	363	1,815	3,268	878	704	337	12,288	6,147	18,435
1916	4,291	1,409	671	431	1,758	3,171	804	623	321	13,479	7,213	20,692
1917	3,595	2,060	531	406	1,499	3,017	679	430	267	12,484	7,732	20,219
1918	4,630	1,652	536	335	1,667	3,386	827	630	387	14,050	8,435	22,485
1919	5,244	2,087	724	453	1,945	3,789	1,007	912	686	16,847	10,409	27,256
1920	4,005	2,079	605	394	1,687	2,891	843	729	358	13,591	9,947	23,538
1921	4,734	1,468	636	357	1,780	2,753	931	633	288	13,580	10,588	24,168
1922	3,874	1,867	628	325	1,574	2,533	730	499	223	12,253	10,111	22,364
1923	4,098	1,857	561	386	1,671	2,970	979	454	216	13,192	8,833	22,025
1924	4,192	2,040	489	373	1,569	2,844	1,089	476	310	13,382	8,819	22,201
1925	3,969	2,357	559	314	1,500	2,420	1,143	545	360	13,167	8,933	22,100
1926	4,405	1,826	636	445	1,762	2,780	1,303	773	449	14,379	9,489	23,868
1927	3,829	1,908	574	445	1,616	2,604	1,348	705	527	13,556	10,383	23,939
1928	3,868	2,295	510	458	1,767	3,037	1,580	891	568	14,974	10,623	25,597
1929	3,785	2,290	534	540	1,753	3,031	1,636	1,139	840	15,548	11,320	26,868

Bureau of Agricultural Economics. Prior to 1915 receipts compiled from yearbooks of stockyard companies; subsequent figures compiled from data of the livestock and meat reporting service of the bureau. Receipts, 1900–1908, are available in 1924 Yearbook, p. 935, Table 542.

[1] Total of the rounded detail figures. [2] Figures prior to 1915 not obtainable.

TABLE 399.—*Sheep: Receipts and stocker and feeder shipments at all public stockyards, 1915–1929*

RECEIPTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1915 [1]	1,517	1,257	1,248	1,019	1,050	1,080	1,264	1,725	2,501	2,359	2,042	1,373	18,435
1916 [1]	1,450	1,280	1,156	1,144	1,347	1,394	1,451	1,984	2,650	3,231	2,126	1,479	20,692
1917	1,578	1,384	1,256	1,152	1,059	1,240	1,353	1,763	2,554	3,195	2,102	1,583	20,219
1918	1,354	1,096	1,270	1,159	1,214	1,429	1,639	2,270	3,496	3,327	2,605	1,626	22,485
1919	1,594	1,157	1,268	1,438	1,468	1,775	2,287	3,360	3,854	3,754	2,845	2,456	27,256
1920	1,614	1,416	1,315	1,466	1,488	1,640	2,034	2,606	2,895	3,027	2,471	1,566	23,538
1921	1,792	1,516	1,750	1,677	1,916	1,849	1,776	2,500	2,618	3,042	2,068	1,664	24,168
1922	1,835	1,399	1,465	1,227	1,692	1,700	1,677	1,951	2,303	3,311	2,288	1,516	22,364
1923	1,636	1,366	1,430	1,447	1,794	1,426	1,661	1,800	2,659	3,464	1,816	1,526	22,025
1924	1,697	1,412	1,367	1,348	1,344	1,550	1,672	2,005	3,027	3,295	1,879	1,605	22,201
1925	1,467	1,388	1,504	1,541	1,689	1,603	1,699	2,064	2,627	3,198	1,712	1,608	22,100
1926	1,548	1,486	1,694	1,502	1,717	1,913	1,739	2,277	3,279	3,090	1,917	1,706	23,868
1927	1,740	1,501	1,558	1,486	2,013	1,816	1,676	2,209	2,848	3,587	1,896	1,609	23,939
1928	1,705	1,669	1,520	1,591	1,952	1,913	1,898	2,362	3,386	3,938	2,053	1,610	25,597
1929	1,877	1,544	1,527	2,012	2,173	1,752	2,119	2,545	3,355	4,093	2,168	1,703	26,868

STOCKER AND FEEDER SHIPMENTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1916 [1]	73	77	62	58	67	83	100	340	661	1,065	546	145	3,277
1917	126	107	68	102	76	146	195	368	968	1,195	791	306	4,448
1918	128	122	124	221	161	242	212	525	1,105	1,245	763	360	5,208
1919	229	131	136	207	160	223	340	1,039	1,505	1,386	860	740	6,956
1920	311	140	135	269	234	227	325	568	796	1,059	857	259	5,180
1921	88	62	84	107	123	89	139	404	555	731	511	202	3,095
1922	183	169	143	97	145	191	204	350	534	1,138	757	256	4,167
1923	171	169	114	82	216	117	188	341	897	1,489	540	154	4,478
1924	149	106	83	105	118	152	226	444	973	1,438	676	206	4,676
1925	138	119	94	109	178	137	193	421	857	1,392	475	219	4,332
1926	155	107	83	124	130	238	260	567	1,093	1,150	493	223	4,623
1927	207	136	140	118	259	258	216	390	947	1,560	497	174	4,902
1928	116	101	96	134	205	278	234	564	1,080	1,466	544	193	5,011
1929	188	115	122	210	218	226	231	639	1,027	1,831	575	183	5,565

Bureau of Agricultural Economics. Compiled from data of livestock and meat reporting service of bureau.

[1] Complete information for 1915 and 1916, particularly on disposition of stock, is not obtainable.

NOTE.—A table similar to Table 403, 1928 Yearbook, receipts, local slaughter, and stocker and feeder shipments of sheep, is omitted.

TABLE 400.—*Feeder sheep, inspected: Shipments from public stockyards, by months, 1929*

Origin and destination	January	February	March	April	May	June	July	August	September	October	November	December	Total
Market origin:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Chicago, Ill.	20,394	15,058	9,338	6,408	12,724	12,315	20,474	76,653	131,512	133,556	62,092	31,040	531,564
Denver, Colo.	43,699	14,026	9,677	6,019	9,386	7,075	2,635	4,436	87,402	687,832	188,087	23,187	1,083,461
East St. Louis, Ill.	343	544	428	1	2,049	2,558	1,935	2,555	3,721	1,991	345	372	16,842
Fort Worth, Tex.	3,844	5,442	6,498	11,255	10,500	6,941	5,994	6,000	6,974	16,268	8,073	2,969	90,758
Kansas City, Kans.	10,869	6,100	9,143	10,936	8,352	4,277	10,182	25,874	34,053	43,250	11,937	9,058	184,031
Louisville, Ky.	-	-	-	202	-	566	5,850	5,660	3,707	639	94	-	16,718
Ogden, Utah	5,343	2,491	382	3,332	10,598	2,101	2,532	11,022	21,483	43,182	13,582	5,267	121,315
Omaha, Nebr.	26,403	17,201	26,447	29,144	33,481	31,831	70,979	198,066	265,224	190,283	53,715	30,223	972,997
Sioux City, Iowa	8,229	4,812	3,121	2,784	1,508	2,282	10,447	31,953	53,357	57,866	24,649	14,431	215,439
South St. Joseph, Mo.	9,252	5,458	947	2,856	5,495	2,778	5,731	26,530	42,539	26,605	8,071	5,488	141,750
South St. Paul, Minn.	5,575	3,482	2,746	1,679	790	-	-	8,671	14,632	40,638	23,109	8,339	109,661
All other inspected	5,574	6,242	7,012	2,686	10,210	6,045	9,243	15,667	30,507	66,415	17,784	3,339	180,724
Total	139,525	80,856	75,739	77,302	105,093	78,769	146,002	413,087	695,111	1,308,525	411,538	133,713	3,665,260
State destination:													
Colorado	26,288	8,322	3,224	6,067	12,966	8,706	3,729	5,345	67,810	580,427	130,125	21,494	874,503
Illinois	5,332	4,088	2,918	1,321	7,327	3,633	14,202	53,779	70,068	44,245	10,952	11,573	229,438
Indiana	3,188	2,134	1,408	2,083	1,502	9,920	13,372	40,044	41,475	31,665	8,856	5,860	161,507
Iowa	8,229	8,437	3,806	5,610	3,424	12,827	44,834	130,508	145,475	99,119	33,409	17,083	512,761
Kansas	11,899	8,799	6,599	5,183	8,123	2,796	5,148	21,604	53,651	65,303	21,225	9,615	219,945
Kentucky	-	-	-	202	1,466	692	6,288	6,119	3,869	1,371	133	-	20,140
Michigan	7,764	6,422	4,346	2,116	3,506	2,268	3,557	10,829	27,428	40,716	28,963	11,133	149,048
Minnesota	823	1,313	800	-	-	482	-	6,207	9,550	13,240	10,987	2,438	45,840
Missouri	3,501	3,495	1,087	5,741	7,803	5,056	7,104	20,063	27,135	26,578	13,511	5,380	126,454
Nebraska	53,069	22,960	38,202	35,354	32,893	20,998	34,870	90,506	181,525	304,131	102,734	31,652	948,894
Ohio	690	886	457	130	288	757	964	6,433	12,033	21,115	4,076	1,743	49,572
South Dakota	2,753	801	384	38	2,399	234	-	5,620	13,364	17,854	6,430	2,657	52,534
Texas	5,314	3,134	2,189	4,561	8,401	3,896	2,425	2,786	3,038	6,635	5,235	2,646	50,260
Wisconsin	6,858	4,991	3,512	2,808	2,332	607	771	3,731	14,289	16,489	8,871	2,943	68,202
All other	3,817	5,074	6,807	6,088	12,663	5,897	8,738	9,513	24,401	39,637	26,031	7,496	156,162
Total	139,525	80,856	75,739	77,302	105,093	78,769	146,002	413,087	695,111	1,308,525	411,538	133,713	3,665,260

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

TABLE 401.—*Feeder sheep, inspected: Shipments from public stockyards, 1920–1928*

Origin and destination	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Market origin:									
Chicago, Ill	829	530	709	683	730	590	784	517	441
Denver, Colo	1, 139	576	954	1, 002	1, 092	1, 022	764	1, 133	1, 004
East St. Louis, Ill	36	13	21	18	18	27	43	20	13
Fort Worth, Tex	59	41	65	39	61	62	87	63	106
Kansas City, Kans	338	251	243	281	280	215	282	283	280
Louisville, Ky	20	25	42	34	18	27	61	51	42
Omaha, Nebr	1, 157	722	768	863	867	611	894	885	882
Sioux City, Iowa	73	50	35	48	59	57	79	96	98
South St. Joseph, Mo	63	39	32	61	103	52	78	106	130
South St. Paul, Minn	87	66	46	73	52	49	62	57	69
All other inspected	132	67	96	75	75	72	120	130	331
Total	3, 933	2, 380	3, 011	3, 177	3, 355	2, 784	3, 254	3, 341	3, 396
State destination:									
Colorado	728	325	679	727	715	610	358	722	730
Illinois	338	198	227	256	280	248	320	193	216
Indiana	125	135	104	150	166	186	270	162	104
Iowa	615	292	282	405	403	302	476	381	457
Kansas	182	93	141	120	183	179	189	234	256
Kentucky	32	32	56	39	23	33	63	58	44
Michigan	280	189	359	314	341	266	342	203	172
Minnesota	45	43	22	32	28	33	40	34	24
Missouri	237	181	172	190	198	138	172	177	171
Nebraska	734	639	692	736	780	608	705	909	864
Ohio	104	83	81	52	32	26	85	33	22
South Dakota	26	11	10	14	14	11	22	43	43
Texas	81	22	35	16	31	25	61	41	64
Wisconsin	83	43	31	40	55	41	50	34	58
All other	323	94	120	86	106	78	101	117	171
Total	3, 933	2, 380	3, 011	3, 177	[1] 3, 355	2, 784	3, 254	3, 341	3, 396

Bureau of Agricultural Economics. Compiled from Bureau of Animal Industry inspection records.

[1] Includes 41 head shipped to Alaska.

TABLE 402.—*Farm prices of sheep, per head, by ages, United States, January 1, 1912–1930*

Jan. 1—	Under 1 year old	Ewes 1 year and over	Wethers 1 year and over	Rams	Jan. 1—	Under 1 year old	Ewes 1 year and over	Wethers 1 year and over	Rams
	Dollars	*Dollars*	*Dollars*	*Dollars*		*Dollars*	*Dollars*	*Dollars*	*Dollars*
1912	2. 64	3. 45	3. 43	8. 26	1922	4. 25	4. 83	4. 05	11. 31
1913	3. 11	3. 98	3. 93	8. 80	1923	6. 80	7. 67	5. 90	14. 30
1914	3. 22	4. 09	4. 06	8. 49	1924	6. 97	8. 10	5. 98	15. 55
1915	3. 62	4. 59	4. 48	9. 01	1925	8. 53	10. 02	7. 13	16. 91
1916	4. 13	5. 35	5. 02	10. 32	1926	9. 04	11. 01	7. 32	18. 45
1917	5. 63	7. 48	6. 78	13. 62	1927	7. 91	10. 32	6. 60	18. 73
1918	9. 06	12. 70	11. 26	20. 84	1928	8. 44	10. 85	7. 36	19. 61
1919	8. 82	12. 44	11. 02	21. 90	1929	8. 83	11. 19	7. 66	20. 30
1920	8. 07	11. 04	9. 64	21. 94	1930	7. 85	9. 13	6. 41	19. 43
1921	5. 33	6. 38	5. 94	15. 13					

Bureau of Agricultural Economics. Based on returns from special price reporters. Average price, by States, weighted by estimated numbers each age group.

TABLE 403.—*Sheep: Estimated price per 100 pounds received by producers, United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	5.63	5.09	5.64	6.10	5.79	5.44	5.47	4.68	4.81	4.68	4.63	4.54	5.24
1911	4.47	4.34	4.45	4.55	4.51	4.24	4.19	3.98	3.91	3.68	3.65	3.71	4.16
1912	3.89	4.01	4.12	4.57	4.74	4.52	4.21	4.26	4.11	4.19	4.05	4.21	4.24
1913	4.35	4.63	4.97	5.16	4.91	4.84	4.20	4.32	4.23	4.16	4.27	4.46	4.55
1914	4.67	4.67	4.77	4.96	4.87	4.70	4.75	4.87	4.80	4.81	4.68	4.95	4.79
1915	4.95	5.14	5.36	5.60	5.54	5.43	5.35	5.16	5.06	5.18	5.18	5.38	5.27
1916	5.52	5.90	6.35	6.61	6.66	6.54	6.33	6.22	6.25	6.20	6.41	6.77	6.29
1917	7.33	8.17	9.21	9.69	10.15	9.84	9.32	9.33	10.05	10.24	10.20	10.44	9.45
1918	10.55	10.75	11.41	11.98	12.32	11.56	11.04	10.99	10.79	10.35	10.11	9.46	10.95
1919	9.68	9.95	10.45	11.33	10.93	10.34	9.25	9.06	8.69	8.46	8.35	8.53	9.63
1920	9.34	9.97	10.25	10.66	10.34	9.13	8.21	7.54	7.24	6.62	6.20	5.54	8.51
1921	5.30	5.01	5.27	5.11	5.11	4.74	4.34	4.38	4.11	3.96	3.84	4.10	4.65
1922	4.57	5.71	6.51	6.43	6.65	6.09	6.11	5.98	5.70	5.93	6.02	6.27	5.96
1923	6.88	6.83	7.06	7.20	6.92	6.43	6.43	6.22	6.57	6.33	6.20	6.39	6.65
1924	6.71	6.82	7.22	7.45	7.33	7.09	6.60	6.32	6.30	6.32	6.39	6.84	6.81
1925	7.86	8.41	8.20	8.42	7.53	7.04	7.17	7.32	7.27	7.31	7.51	7.79	7.70
1926	7.95	8.20	7.66	7.67	7.78	7.56	7.09	6.92	7.13	6.93	6.75	6.95	7.43
1927	6.87	7.16	7.41	7.40	7.68	7.27	7.16	7.13	7.06	7.05	7.42	7.38	7.26
1928	7.52	7.60	7.85	8.11	8.09	7.84	7.56	7.53	7.58	7.50	7.50	7.29	7.68
1929	7.84	7.98	8.36	8.40	8.09	7.86	7.25	7.32	7.01	6.83	6.75	6.61	7.55

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of sheep Jan. 1, by States; yearly price obtained by weighting monthly prices by Federal inspected slaughter.

TABLE 404.—*Lambs: Estimated price per 100 pounds received by producers, United States, 1910–1929*

Year beginning June	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	7.13	6.71	5.70	5.85	5.78	5.54	5.60	5.71	5.44	5.49	5.77	5.74	5.79
1911	5.51	5.42	5.25	5.02	4.68	4.68	4.93	5.22	5.15	5.38	5.98	6.16	5.28
1912	6.02	5.74	5.60	5.49	5.42	5.37	5.70	6.03	6.34	6.56	6.59	6.66	5.96
1913	6.36	6.05	5.50	5.51	5.51	5.64	5.85	6.16	6.18	6.31	6.47	6.49	6.03
1914	6.47	6.55	6.26	6.27	6.09	6.14	6.33	6.47	6.67	6.06	7.35	7.32	6.49
1915	7.26	7.21	6.70	6.71	6.70	6.76	7.02	7.29	7.78	8.10	8.58	8.49	7.38
1916	8.36	8.16	8.15	8.22	8.02	8.41	8.72	9.59	10.51	11.46	12.03	12.51	9.50
1917	12.64	11.19	12.08	13.06	14.09	13.79	13.81	13.83	13.77	14.11	15.34	15.39	13.60
1918	14.98	14.20	14.20	13.73	13.20	12.54	12.44	12.71	13.17	14.03	14.61	14.34	13.65
1919	13.89	13.09	12.91	12.25	11.47	11.45	11.85	12.91	14.08	14.17	14.63	14.26	13.05
1920	12.82	11.79	10.84	10.31	9.65	9.37	8.46	8.44	7.76	7.90	7.55	7.78	9.41
1921	7.59	7.37	6.99	6.27	5.98	6.12	6.60	7.33	8.87	10.21	10.54	10.39	7.83
1922	9.87	9.55	9.39	9.43	10.06	10.30	10.49	10.69	10.83	11.01	10.69	11.00	10.30
1923	10.72	10.60	9.96	10.28	10.17	10.01	10.10	10.19	10.53	11.22	11.32	11.43	10.54
1924	11.21	10.50	10.15	10.18	10.35	10.55	10.96	12.69	13.13	13.48	12.22	11.99	11.45
1925	11.62	11.71	11.80	11.95	12.04	12.20	12.67	12.79	12.02	11.56	11.32	11.78	11.98
1926	12.07	11.52	11.12	11.32	11.31	11.11	10.92	10.65	10.84	11.55	11.97	11.92	11.36
1927	11.95	11.44	11.15	11.14	11.22	11.42	11.39	11.34	11.90	12.31	12.73	13.03	11.76
1928	13.18	12.25	11.88	11.97	11.57	11.50	11.41	12.23	12.60	13.12	13.36	12.79	12.31
1929	12.31	11.90	11.46	11.08	10.97	10.74	10.76	------	------	------	------	------	----------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of lambs Jan. 1, by States; yearly price obtained by weighted monthly prices by receipts at principal markets.

TABLE 405.—*Sheep and lambs: Average price per 100 pounds at Chicago, by months, 1905–1929*

SHEEP

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average[1]
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1905	5.15	5.55	5.50	5.08	4.75	4.72	5.10	4.95	4.72	5.10	5.10	5.25	5.08
1906	5.40	5.12	5.28	5.35	5.55	5.45	5.25	4.98	5.15	4.90	5.05	5.08	5.21
1907	5.15	5.20	5.50	5.65	5.78	5.90	5.32	5.32	5.18	4.82	4.38	4.18	5.20
1908	4.80	5.10	5.90	5.70	5.40	4.65	4.05	3.80	3.75	4.05	4.20	4.30	4.64
1909	4.90	5.00	5.25	5.65	6.15	5.30	4.70	4.60	4.65	4.30	4.55	4.85	4.99
1910	5.55	6.50	7.60	7.60	6.55	5.10	4.20	4.20	4.25	3.95	3.70	3.90	5.26
1911	4.10	4.15	4.70	4.20	4.45	3.80	3.95	3.50	3.80	3.65	3.45	3.55	3.94
1912	4.30	4.15	5.30	5.90	6.15	4.50	4.25	4.05	4.15	4.00	4.05	4.45	4.60
1913	5.35	5.90	6.40	6.45	5.85	5.05	4.50	4.35	4.30	4.55	4.60	4.95	5.19
1914	5.50	5.70	5.95	6.25	5.65	5.10	5.40	5.55	5.30	5.20	5.65	5.40	5.56
1915	5.80	6.45	7.45	7.70	7.35	5.50	6.05	6.25	5.75	6.00	5.85	6.20	6.36
1916	7.20	7.75	8.25	8.15	8.20	7.35	7.25	7.35	7.80	7.50	8.00	9.00	7.82
1917	10.00	11.25	11.70	12.10	13.00	10.00	9.10	9.75	11.15	11.65	11.25	11.50	11.04
1918	12.20	12.35	13.60	15.65	14.75	13.40	12.65	13.15	11.80	10.45	9.85	9.40	12.44
1919	10.35	11.35	14.05	14.50	12.25	9.30	9.70	9.75	8.30	8.15	8.30	9.60	10.47
1920	11.80	13.35	13.40	14.25	12.25	8.50	8.90	7.70	6.85	6.45	5.75	4.70	9.49
1921	5.07	4.90	6.14	6.58	6.33	4.46	5.08	4.53	4.49	4.71	4.40	4.92	5.13
1922	7.26	8.28	9.17	9.33	7.35	5.59	6.12	5.63	6.05	6.25	7.48	7.28	7.15
1923	7.72	8.08	8.64	8.90	6.74	5.00	5.16	7.09	7.25	6.35	6.89	7.37	7.10
1924	8.16	9.12	10.50	10.21	8.11	5.82	5.66	6.18	5.46	6.60	6.62	8.45	7.57
1925	10.33	9.69	9.22	7.84	7.96	6.25	7.48	6.83	6.95	7.64	8.16	9.57	8.16
1926	9.72	9.18	8.82	8.87	7.97	5.85	5.97	6.50	6.25	6.12	5.88	5.86	7.25
1927	6.94	8.03	8.88	9.62	7.44	5.88	6.25	6.47	6.14	6.00	6.40	6.41	7.04
1928	7.03	8.96	9.47	10.16	8.53	6.12	6.28	6.72	6.34	6.18	5.84	7.03	7.39
1929	9.32	8.78	9.72	10.34	6.77	6.28	5.85	5.34	4.56	4.70	5.38	5.41	6.87

LAMBS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average[1]
1905	7.15	7.40	7.05	6.80	6.25	5.90	6.30	7.05	7.00	7.05	6.90	7.25	6.84
1906	7.25	6.75	6.40	6.20	6.65	6.75	6.90	7.00	7.15	6.95	6.90	7.10	6.83
1907	7.30	7.30	7.55	8.05	7.80	7.20	7.05	6.90	6.90	6.80	6.05	5.70	7.05
1908	6.80	6.70	7.20	7.25	6.65	5.75	6.20	6.05	5.35	5.50	5.85	6.70	6.33
1909	7.35	7.50	7.65	7.85	8.25	7.60	7.70	7.35	6.80	6.50	7.10	7.50	7.43
1910	8.30	8.65	9.40	9.10	8.40	7.60	7.10	6.70	6.80	6.65	6.25	6.10	7.59
1911	6.20	6.05	6.10	5.50	5.85	6.10	6.30	6.35	5.70	5.75	5.45	5.75	5.92
1912	6.50	6.15	7.30	7.95	8.30	6.90	7.25	7.10	7.00	6.75	7.15	7.75	7.18
1913	8.55	8.50	8.60	8.40	7.40	6.85	7.55	7.40	7.15	7.05	7.25	7.60	7.69
1914	7.90	7.60	7.65	7.60	8.10	7.95	8.45	8.15	7.80	7.60	8.75	8.30	7.99
1915	8.40	8.75	9.55	9.65	10.10	9.20	8.75	8.90	8.75	8.75	8.80	9.00	9.05
1916	10.30	10.90	11.10	10.45	10.75	9.55	10.55	10.75	10.60	10.15	11.40	12.70	10.77
1917	13.85	14.30	14.25	14.40	16.90	15.25	15.65	15.50	17.50	17.40	16.75	16.45	15.68
1918	17.20	16.60	17.55	19.20	18.00	16.85	18.50	17.50	17.25	15.35	15.10	14.60	16,98
1919	16.25	17.40	19.05	18.15	16.25	14.05	17.10	16.75	14.85	15.00	14.50	16.40	16.31
1920	19.50	19.95	18.80	18.80	17.40	14.25	15.55	13.20	13.30	12.35	11.70	11.20	15.50
1921	10.72	9.07	9.91	9.69	11.07	10.67	10.09	9.46	8.86	8.66	9.25	10.86	9.86
1922	12.67	14.49	15.39	14.10	12.95	12.42	13.04	12.51	13.53	13.94	14.17	14.93	13.68
1923	14.69	14.85	14.56	14.42	14.12	14.81	14.22	12.89	13.52	12.93	12.75	12.96	13.89
1924	13.53	14.95	16.06	16.22	15.23	14.12	13.79	13.57	13.38	13.52	14.03	16.47	14.57
1925	18.28	17.59	16.28	14.85	13.06	15.86	15.11	14.88	15.19	15.20	15.44	16.15	15.66
1926	15.28	13.78	13.48	14.38	15.30	16.66	14.31	14.20	14.05	13.88	13.25	12.57	14.26
1927	12.64	13.28	15.27	15.87	14.75	15.66	14.25	13.68	13.46	13.70	13.80	13.14	14.12
1928	13.16	15.39	16.26	16.81	16.10	16.84	15.61	14.72	14.29	13.12	13.31	14.31	14.99
1929	16.37	16.53	17.07	16.82	13.62	15.35	14.38	13.50	13.19	12.72	12.72	13.22	14.62

Bureau of Agricultural Economics. Figures prior to 1921 for sheep and lambs, compiled from Chicago Drovers Journal Yearbook; subsequent figures are bulk of sales prices from data of the livestock and meat reporting service of the bureau. See 1927 Yearbook, p. 1031, for prices of lambs, 1901-1904.

[1] Simple average of monthly prices.

TABLE 406.—*Sheep and lambs: Average price per 100 pounds at Chicago and Omaha, by months, July, 1927, to December, 1929*

Year and month	Chicago							Omaha						
	Lambs		Yearling wethers, 110 pounds down, medium to choice	Ewes		Feeder lambs		Lambs		Yearling wethers, 110 pounds down, medium to choice	Ewes		Feeder lambs	
	84 pounds down, good and choice	All weights, cull and common		120 pounds down, medium to choice	Cull and common	Good and choice	Medium	84 pounds down, good and choice	All weights, cull and common		120 pounds down, medium to choice	Cull and common	Good and choice	Medium
1927	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*
July	14.18	10.79	10.83	5.97	3.25	12.94	11.85	13.66	10.17	10.18	5.73	3.16	12.83	11.87
August	13.49	10.27	10.42	5.90	3.12	13.02	11.90	13.07	9.91	9.59	5.75	3.16	13.13	12.15
September	13.38	10.46	10.25	5.06	2.56	13.40	12.38	12.94	9.96	9.09	5.36	2.88	13.16	12.06
October	13.68	11.01	10.98	5.60	3.04	14.04	13.26	13.09	10.34	9.25	5.38	3.00	13.31	12.22
November	13.88	11.38	11.16	5.93	3.35	14.03	13.30	13.27	10.92	9.59	5.52	3.05	13.45	12.45
December	13.38	10.68	10.49	6.04	3.40	13.35	12.56	12.81	10.15	9.45	5.88	3.15	12.46	11.74
Av. 6 months	13.66	10.76	10.69	5.75	3.12	13.46	12.54	13.14	10.24	9.52	5.60	3.07	13.06	12.08
1928														
January	13.35	10.81	10.78	6.49	3.74	12.88	12.04	12.85	10.22	9.24	6.28	3.47	12.45	11.58
February	15.39	12.88	13.23	8.43	5.17	14.68	13.94	14.93	12.18	11.56	7.81	4.65	14.21	12.89
March	16.36	13.88	14.32	8.87	5.46	15.45	14.47	15.80	13.36	12.28	8.60	5.21	15.02	13.70
April	16.78	14.04	14.21	9.78	6.06	16.01	14.88	16.20	13.76	12.90	8.80	5.26	15.38	14.12
May	16.19	12.87	13.42	8.26	4.72	-----	-----	15.49	13.02	12.71	7.70	4.16	-----	-----
June	16.65	13.01	12.40	6.62	3.74	-----	-----	15.88	12.74	12.63	5.76	3.03	12.92	12.00
July	15.39	11.86	11.27	6.21	3.54	13.37	12.74	14.67	11.35	10.76	5.75	3.25	13.09	12.24
August	14.50	10.48	10.68	6.43	3.58	13.78	13.19	13.94	10.43	10.35	6.15	3.45	13.47	12.70
September	14.12	10.08	10.26	6.06	3.44	14.03	13.20	13.73	10.01	9.78	6.21	3.50	13.25	12.38
October	13.10	9.68	9.84	5.77	3.38	12.85	11.91	12.83	9.35	9.28	6.00	3.36	12.82	11.94
November	13.30	10.07	10.00	5.89	3.40	12.86	11.89	12.67	9.67	9.03	5.77	3.19	12.39	11.54
December	14.17	10.46	10.78	6.77	3.96	13.52	12.28	13.46	10.34	9.84	6.38	3.74	12.96	11.92
Average	14.94	11.68	11.77	7.13	4.18	-----	-----	14.37	11.37	10.86	6.77	3.86	-----	-----
1929														
January	16.39	12.27	12.44	9.14	5.87	14.69	13.12	15.70	11.91	11.82	8.32	5.34	14.82	13.54
February	16.64	12.89	12.95	8.76	5.89	15.23	13.62	16.01	12.29	12.00	8.62	5.50	15.18	13.98
March	16.99	13.34	13.29	9.63	6.28	15.58	13.88	16.26	12.66	12.29	9.25	5.92	15.26	13.84
April	16.87	13.74	13.28	10.20	6.52	15.87	14.11	16.56	13.35	12.66	9.56	6.05	15.34	13.75
May	13.78	10.78	10.88	6.88	4.33	-----	-----	13.27	10.84	10.29	6.52	3.80	-----	-----
June	15.32	12.23	10.16	6.22	4.05	13.03	12.00	14.80	12.25	10.12	6.15	3.68	12.92	11.82
		Common							*Common*					
July	14.31	11.34	10.17	6.06	3.94	13.12	12.00	13.91	11.25	10.19	6.01	3.60	12.93	11.70
August	13.49	10.20	9.68	5.62	3.69	13.08	11.92	12.79	9.84	9.14	5.50	3.42	12.78	11.63
September	13.21	9.89	9.44	4.87	3.38	12.72	11.55	12.70	9.48	8.84	4.75	3.00	12.51	11.45
October	12.71	9.99	9.19	4.79	3.19	12.63	11.43	12.22	9.40	8.43	4.79	3.00	12.32	11.28
November	12.77	10.02	9.46	5.19	3.40	12.45	11.30	12.07	9.41	8.38	5.03	3.00	12.00	10.90
December	13.19	10.38	9.88	5.47	3.66	12.23	11.12	12.28	9.75	8.62	5.12	3.00	11.92	10.80
Average	14.64	----------	10.90	6.90	4.52	-----	-----	14.05	----------	10.23	6.64	4.11	-----	-----

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the Bureau. Earlier data in 1927 Yearbook, pp. 1032–1034.

TABLE 407.—*Sheep and lambs: Monthly slaughter under Federal inspection, 1907–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	1,017	837	842	861	769	735	865	900	892	973	793	769	10,252
1908	872	725	677	664	732	842	891	932	1,064	1,048	928	930	10,305
1909	906	806	903	839	712	843	964	1,019	1,153	1,169	1,029	1,000	11,343
1910	903	771	727	693	796	927	967	1,095	1,154	1,206	1,125	1,044	11,408
1911	1,130	1,019	1,059	974	1,085	1,146	1,150	1,268	1,257	1,428	1,304	1,200	14,020
1912	1,383	1,151	1,106	971	963	1,028	1,181	1,390	1,440	1,723	1,424	1,220	14,979
1913	1,192	961	883	1,049	1,127	1,135	1,273	1,243	1,486	1,514	1,258	1,284	14,406
1914	1,297	1,113	1,143	1,150	1,085	1,113	1,171	1,169	1,379	1,331	1,112	1,167	14,229
1915	1,196	946	986	830	739	883	984	1,139	1,220	1,116	1,132	1,041	12,212
1916	976	904	861	769	854	990	930	1,173	1,158	1,172	1,121	1,033	11,941
1917	956	819	861	777	632	710	688	766	740	822	764	809	9,345
1918	780	655	736	614	659	737	869	937	1,029	1,194	1,139	971	10,320
1919	1,004	754	738	808	894	931	1,160	1,234	1,292	1,414	1,227	1,235	12,691
1920	955	828	788	714	671	818	1,048	1,042	1,151	1,068	968	932	10,982
1921	1,068	958	1,075	1,041	935	1,116	1,060	1,237	1,249	1,285	1,040	890	13,005
1922	954	776	837	739	872	1,028	964	1,024	1,013	981	882	858	10,929
1923	1,021	836	977	960	972	914	962	957	990	1,046	915	878	11,520
1924	1,083	912	868	860	959	975	1,051	1,063	1,150	1,148	950	972	11,991
1925	990	854	984	1,012	1,030	999	1,071	1,031	1,086	1,083	879	981	12,001
1926	1,039	988	1,163	994	959	1,081	1,042	1,093	1,224	1,167	1,039	1,172	12,961
1927	1,115	1,006	1,027	960	992	1,058	1,014	1,168	1,185	1,194	1,070	1,094	12,882
1928	1,151	1,048	1,016	918	1,016	1,109	1,076	1,196	1,307	1,409	1,189	1,053	13,488
1929	1,150	953	1,006	1,119	1,202	1,108	1,255	1,298	1,317	1,365	1,159	1,091	14,023

Bureau of Animal Industry.

TABLE 408.—*Sheep and lambs, slaughter statistics: Source of supply, classification, slaughter costs, weights, and yields, 1923–1929*

Year and month	Source of supply		Age classification		Average live cost per 100 pounds	Average live weight	Dressed weight as percentage of live weight	By-product yield (on basis of live weight)	
	Stockyards	Other	Sheep	Lambs and yearlings				Edible fat [1]	Edible offal
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Dollars*	*Pounds*	*Per cent*	*Per cent*	*Per cent*
1923	85.97	14.03	13.16	86.84	12.03	80.80	48.07	2.85	1.94
1924	83.60	16.40	10.66	89.34	12.77	80.14	47.53	2.76	1.95
1925	82.44	17.56	10.30	89.70	14.22	81.58	47.82	2.74	2.24
1926	84.64	15.36	9.62	90.38	12.86	81.34	47.62	2.68	2.35
1927	85.42	14.58	8.91	91.09	12.97	81.66	47.74	2.64	2.44
1928	86.31	13.69	8.26	91.74	13.53	81.93	47.36	2.52	2.49
1929	83.99	16.01	8.77	91.23	13.24	82.57	47.19	2.43	2.51
1929									
January	85.80	14.20	7.41	92.59	14.97	85.32	46.43	2.75	2.33
February	86.37	13.63	6.88	93.12	15.44	87.82	45.97	2.82	2.57
March	83.16	16.84	5.85	94.15	15.94	88.28	46.07	2.63	2.53
April	81.10	18.90	8.44	91.56	15.85	85.06	46.88	2.75	2.50
May	76.72	23.28	12.88	87.12	13.82	80.60	47.95	2.70	2.48
June	84.93	15.07	10.06	89.94	12.83	77.96	48.70	2.46	2.69
July	83.19	16.81	8.04	91.96	12.95	77.68	48.08	2.23	2.55
August	85.86	14.14	8.61	91.39	11.91	79.90	47.43	2.14	2.47
September	85.02	14.98	8.56	91.44	11.62	80.39	47.49	2.15	2.43
October	84.72	15.28	8.79	91.21	11.35	81.44	47.50	2.19	2.60
November	84.79	15.21	10.32	89.68	11.28	83.54	46.82	2.17	2.49
December	86.45	13.55	8.35	91.65	11.82	85.89	46.76	2.22	2.51

Bureau of Agricultural Economics. Compiled from monthly reports to the bureau from packers and slaughterers, whose slaughterings equaled 75 to 85 per cent of total slaughter under Federal inspection.

[1] Unrendered.

TABLE 409.—*Mutton and lamb, frozen: Cold-storage holdings, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1916	4, 976	5, 286	5, 812	5, 084	3, 858	2, 525	1, 939	2, 098	2, 135	2, 579	3, 465	5, 000
1917	4, 886	5, 895	4, 949	4, 872	4, 369	3, 508	4, 380	3, 912	2, 716	2, 768	4, 194	5, 406
1918	7, 403	6, 315	7, 855	5, 599	3, 318	3, 860	2, 429	3, 150	5, 046	5, 275	8, 645	9, 035
1919	12, 760	11, 360	8, 013	6, 505	7, 623	7, 718	7, 279	7, 263	7, 817	8, 318	7, 894	9, 409
1920	10, 290	7, 787	5, 781	3, 517	2, 579	5, 735	4, 311	2, 299	11, 021	25, 325	48, 997	56, 702
1921	68, 032	78, 082	59, 304	38, 520	25, 129	15, 877	8, 714	6, 751	5, 903	5, 993	6, 840	7, 520
1922	6, 444	3, 914	2, 863	2, 878	2, 071	2, 310	3, 720	3, 308	3, 376	3, 473	3, 458	3, 633
1923	4, 523	5, 980	5, 758	6, 635	5, 774	4, 445	3, 556	2, 752	1, 785	1, 719	1, 997	2, 014
1924	2, 493	2, 306	2, 173	1, 719	2, 093	2, 273	2, 917	2, 257	2, 230	2, 525	3, 166	3, 326
1925	2, 949	2, 336	2, 294	2, 090	1, 998	1, 913	1, 535	1, 349	1, 339	1, 112	1, 435	1, 549
1926	1, 820	2, 354	3, 346	3, 289	2, 393	1, 697	1, 871	1, 813	1, 929	2, 234	2, 814	3, 166
1927	4, 556	4, 447	4, 074	2, 940	1, 862	1, 210	1, 360	1, 161	1, 302	1, 991	2, 958	3, 790
1928	4, 408	4, 404	4, 020	3, 252	1, 828	1, 276	1, 947	1, 822	1, 691	2, 113	4, 321	5, 472
1929	5, 623	4, 009	3, 252	3, 109	2, 533	2, 461	3, 061	2, 639	3, 159	4, 113	4, 992	5, 194

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

NOTE.—A table similar to Table 414, 1928 Yearbook, livestock and meat situation, is omitted.

TABLE 410.—*Mutton and lamb: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1911–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
New Zealand	0	235, 509	1	291, 039	0	279, 731	0	311, 135	0	317, 539
Argentina	0	148, 457	0	202, 576	0	148, 213	0	183, 260	0	171, 108
Australia	7	149, 958	[1] 47	[1] 50, 271	[1] 2	[1] 85, 682	[1] 6	[1] 93, 520	[1] 4	[1] 46, 363
Uruguay	0	3, 262	0	22, 658	0	50, 358	0	52, 102	0	31, 304
Netherlands	76	17, 212	1, 069	17, 082	1, 472	14, 308	1, 255	16, 084	759	14, 380
Irish Free State	0	0	486	187	400	55	275	1, 478	312	2, 359
Union of South Africa	1, 914	75	1	184	0	175	52	133	47	201
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	596, 899	0	622, 482	0	613, 633	0	627, 303	0	640, 794	0
Canada	4, 717	48	1, 321	2, 641	1, 673	1, 274	1, 946	1, 889	2, 333	1, 128
France	930	334	23, 737	200	20, 385	146	29, 822	274	15, 315	300
United States	185	4, 146	2, 770	1, 464	3, 365	1, 171	9, 544	937	9, 202	1, 024
Germany	1, 046	350	2, 002	2, 122	8, 217	361	10, 083	622	9, 909	79
Norway	0	0	4, 666	0	4, 263	0	4, 902	0	4, 358	0
Belgium	--------	--------	2, 904	627	3, 130	475	3, 914	839	3, 970	442
Denmark	3, 828	344	1, 328	35	2, 214	2	2, 232	5	736	0
Sweden	1, 218	100	731	60	1, 148	7	1, 371	29	1, 089	45
Total 16 countries	610, 820	559, 795	663, 545	591, 146	659, 902	581, 958	692, 705	662, 307	688, 828	586, 272

Bureau of Agricultural Economics. Official sources.

[1] Year ended June 30.

TABLE 411.—*Sheep and lambs: Shipments and slaughter, by States, average 1924–1928, annual 1928*

State and division	Average 1924–1928 [1]												1928 [1]											
	Shipments and local slaughter				Inshipments, stocker, feeder, and breeding				Farm slaughter				Shipments and local slaughter				Inshipments, stocker, feeder, and breeding				Farm slaughter			
	Sheep		Lambs		Sheep		Lambs		Sheep		Lambs		Sheep		Lambs		Sheep		Lambs		Sheep		Lambs	
	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Weight per head	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight	Head	Total weight
	Thousands	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*
Maine	8	110	33	65	.....	.....	.....	.....	3	110	3	65	7	770	35	2,275	.....	.....	.....	.....	3	330	4	260
New Hampshire	2	110	5	65	.....	.....	.....	.....	1	110	2	65	2	220	6	390	.....	.....	.....	.....	1	110	2	130
Vermont	5	111	19	65	.....	.....	.....	.....	1	111	2	67	3	330	19	1,235	.....	.....	.....	.....	1	110	2	140
Massachusetts	2	114	3	68	.....	.....	.....	.....	.....	.....	1	68	2	220	3	195	.....	.....	.....	.....	.....	.....	2	130
Rhode Island	.....	.....	1	66	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	65	.....	.....	.....	.....	.....	.....	.....	.....
Connecticut	1	110	2	65	.....	.....	.....	.....	.....	.....	1	65	1	110	3	195	.....	.....	.....	.....	.....	.....	1	65
New York	44	115	261	75	.....	.....	48	60	8	115	25	75	55	6,325	297	22,275	.....	.....	38	2,280	6	690	26	1,950
New Jersey	.....	.....	4	69	.....	.....	.8	59	.8	130	.....	.....	.....	.....	3	210	.....	.....	1	60	.....	38	.....	.....
Pennsylvania	49	105	164	70	.....	.....	2	60	5	124	9	71	53	5,565	159	11,130	.....	.....	4	240	4	480	8	600
N. Atlantic	113	110	492	72	.....	.....	51	60	19	117	44	72	123	13,540	526	37,970	.....	.....	43	2,580	15	1,758	45	3,275
Ohio	156	115	815	70	9	100	46	65	3	120	3	80	145	16,675	806	56,420	8	800	20	1,300	3	360	5	400
Indiana	32	120	517	85	18	100	195	68	1	137	1	84	36	4,320	470	39,950	5	500	127	8,636	1	125	1	80
Illinois	63	120	617	85	30	96	327	69	1	120	3	85	68	8,160	547	46,495	20	2,000	250	17,500	1	120	3	255
Michigan	82	120	822	85	26	100	317	68	2	122	7	84	117	14,040	744	63,240	12	1,200	174	11,832	4	480	4	320
Wisconsin	50	110	296	80	12	110	118	70	4	120	3	80	62	6,820	313	25,040	4	440	134	9,380	4	480	3	240
Minnesota	55	110	303	79	27	100	52	60	2	110	8	80	60	6,600	362	28,252	4	400	29	1,827	3	330	9	720
Iowa	90	120	788	80	28	100	398	64	3	122	4	81	91	10,920	781	62,480	51	5,100	434	28,210	3	375	4	328
Missouri	89	110	798	77	42	105	276	65	2	116	5	75	83	9,130	812	60,900	43	4,515	317	20,605	2	240	5	375
North Dakota	34	110	183	80	43	100	18	65	3	120	4	80	52	5,720	238	19,040	30	3,000	15	975	4	480	4	320
South Dakota	44	110	297	75	4	110	26	65	2	110	5	75	57	6,270	323	24,225	6	660	36	2,340	2	220	5	375
Nebraska	68	110	1,164	90	50	100	1,109	65	1	110	2	75	75	8,250	1,287	115,810	48	4,800	1,323	85,995	1	110	2	150
Kansas	52	110	479	89	48	110	348	66	1	110	1	81	56	6,160	526	47,335	34	3,740	350	23,450	1	110	1	84
N. Central	815	114	7,079	82	337	102	3,230	66	27	118	47	80	902	103,065	7,209	589,187	265	27,155	3,209	212,050	29	3,430	46	3,647

[1] Preliminary.

TABLE 411.—*Sheep and lambs: Shipments and slaughter, by States, average 1924–1928, annual 1928*—Continued

Average 1924–1928 [1]

State and division	Shipments and local slaughter: Sheep: Head	Shipments and local slaughter: Sheep: Weight per head	Shipments and local slaughter: Lambs: Head	Shipments and local slaughter: Lambs: Weight per head	Inshipments, stocker, feeder, and breeding: Sheep: Head	Inshipments, stocker, feeder, and breeding: Sheep: Weight per head	Inshipments, stocker, feeder, and breeding: Lambs: Head	Inshipments, stocker, feeder, and breeding: Lambs: Weight per head	Farm slaughter: Sheep: Head	Farm slaughter: Sheep: Weight per head	Farm slaughter: Lambs: Head	Farm slaughter: Lambs: Weight per head
	Thousands	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*	*Thousands*	*Lbs.*
Delaware	------	------	1	65	------	------	------	------	------	------	------	------
Maryland	10	110	62	80	3	110	3	62	1	110	1	80
Virginia	21	120	276	79	10	96	------	------	2	120	7	80
West Virginia	48	110	283	80	3	110	------	------	5	110	3	80
North Carolina	6	85	30	55	------	------	------	------	3	86	2	55
South Carolina	2	90	3	45	------	------	------	------	.2	90	1	45
Georgia	5	85	11	50	------	------	------	------	2.0	85	1	50
Florida	7	85	4	50	------	------	------	------	------	------	------	------
S. Atlantic	98	107	671	78	15	101	3	62	13	102	16	72
Kentucky	74	110	585	75	53	100	2	75	5	114	5	75
Tennessee	36	110	180	75	6	110	3	65	2	110	4	75
Alabama	8	80	11	50	4	80	------	------	2	80	1	50
Mississippi	24	80	14	50	.6	80	------	------	3	80	2	50
Arkansas	7	100	23	60	.2	80	.2	50	2	100	1	60
Louisiana	13	90	8	50	.6	90	------	------	3	90	2	50
Oklahoma	13	105	46	65	8	100	21	50	1	107	1	75
Texas	483	104	380	61	26	100	15	63	5	102	10	70
S. Central	656	103	1, 248	69	98	100	41	57	23	99	26	67
Montana	389	110	1, 022	67	210	110	102	75	9	116	7	75
Idaho	292	115	1, 297	80	179	110	257	65	7	115	8	80
Wyoming	227	104	981	67	26	100	27	66	10	105	4	70
Colorado	184	105	2, 097	80	196	100	1, 571	65	9	105	9	80
New Mexico	148	100	568	65	13	100	15	70	44	100	14	70

1928 [1]

State and division	Shipments and local slaughter: Sheep: Head	Shipments and local slaughter: Sheep: Total weight	Shipments and local slaughter: Lambs: Head	Shipments and local slaughter: Lambs: Total weight	Inshipments, stocker, feeder, and breeding: Sheep: Head	Inshipments, stocker, feeder, and breeding: Sheep: Total weight	Inshipments, stocker, feeder, and breeding: Lambs: Head	Inshipments, stocker, feeder, and breeding: Lambs: Total weight	Farm slaughter: Sheep: Head	Farm slaughter: Sheep: Total weight	Farm slaughter: Lambs: Head	Farm slaughter: Lambs: Total weight
	Thousands	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*	*Thousands*	*1,000 lbs.*
Delaware	------	------	1	65	------	------	------	------	------	------	------	------
Maryland	6	660	71	5, 680	3	330	3	195	1	110	1	80
Virginia	10	1, 200	297	23, 760	10	900	------	------	3	360	8	640
West Virginia	62	6, 820	296	23, 680	3	330	------	------	5	550	5	400
North Carolina	9	765	32	1, 760	------	------	------	------	2	180	3	165
South Carolina	1	90	3	135	------	------	------	------	1	90	1	45
Georgia	2	170	8	400	------	------	------	------	2	170	2	100
Florida	6	510	3	150	------	------	------	------	------	------	------	------
S. Atlantic	96	10, 215	711	55, 630	16	1, 560	3	195	14	1, 460	20	1, 430
Kentucky	69	7, 710	698	52, 350	44	4, 400	4	300	6	720	7	525
Tennessee	50	5, 500	186	13, 950	5	550	2	130	3	330	5	375
Alabama	4	320	10	500	7	560	------	------	1	80	2	100
Mississippi	14	1, 120	6	300	3	240	------	------	1	80	1	50
Arkansas	11	1, 100	16	960	1	80	------	------	2	200	1	60
Louisiana	9	810	5	250	1	90	------	------	3	270	3	150
Oklahoma	14	1, 470	69	4, 485	17	1, 700	28	1, 400	1	110	1	75
Texas	492	46, 740	293	18, 510	20	2, 000	12	720	5	450	10	700
S. Central	663	64, 770	1, 283	91, 305	98	9, 620	46	2, 550	22	2, 240	30	2, 035
Montana	375	41, 250	1, 107	83, 025	271	29, 810	29	2, 175	11	1, 320	9	675
Idaho	316	36, 340	1, 286	102, 880	247	27, 170	117	7, 605	7	805	8	640
Wyoming	279	29, 574	951	67, 521	37	3, 700	25	1, 700	10	1, 100	5	355
Colorado	152	15, 960	2, 270	181, 600	116	11, 600	1, 682	105, 966	9	945	9	720
New Mexico	175	17, 500	520	33, 800	10	1, 000	22	1, 540	40	4, 000	20	1, 400

Arizona	53	105	308	67	------	-----	------	-----	78	105	27	70	42	4, 494	305	21, 350	------	------	------	------	90	9, 630	25	1, 750
Utah	147	110	942	72	2	110	12	70	12	109	21	74	153	16, 830	1, 093	76, 510	9	990	30	2, 100	20	2, 200	15	1, 125
Nevada	72	105	469	67	9	105	1	65	6	103	13	68	109	11, 445	481	31, 265	20	2, 100	3	195	7	700	14	952
Washington	40	110	329	80	14	100	28	70	2	112	7	80	40	4, 400	340	27, 200	3	300	18	1, 260	2	240	7	560
Oregon	238	109	765	76	4	110	------	-----	11	110	5	76	230	24, 610	869	66, 044	6	660	------	------	10	1, 100	6	456
California	416	100	1, 674	70	56	98	497	76	11	110	11	75	386	38, 600	1, 910	137, 520	48	4, 320	548	43, 840	10	1, 100	10	750
Far Western	2, 205	107	10, 452	74	709	105	2, 510	67	199	106	127	73	2, 257	241, 003	11, 132	828, 715	767	81, 650	2, 474	166, 381	216	23, 140	128	9, 383
United States	3, 887	108	19, 942	77	1, 159	104	5, 835	66	281	107	260	74	4, 041	432, 593	20, 861	1, 602, 807	1, 146	119, 985	5, 775	383, 756	296	32, 028	269	19, 770

Bureau of Agricultural Economics, Estimates division of Crop and Livestock Estimates.

[1] Preliminary.

TABLE 412.—*Sheep and lambs: Value of production and income, average 1924–1928, annual 1928*

State and division	Average 1924–1928 [1]				1928 [1]			
	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production	Value of amount consumed on farms	Receipts from sales	Gross income	Value of production
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	12	347	360	364	13	342	355	351
New Hampshire	6	75	81	82	5	78	83	78
Vermont	5	184	188	185	5	175	180	182
Massachusetts	1	52	53	49	2	56	58	54
Rhode Island		9	9	9		8	8	8
Connecticut	1	41	42	40	1	41	42	40
New York	29	2,625	2,653	2,656	29	3,171	3,200	2,904
New Jersey	2	32	33	33	1	23	24	23
Pennsylvania	16	1,803	1,819	1,812	15	1,814	1,829	1,823
North Atlantic	72	5,167	5,239	5,228	71	5,708	5,779	5,463
Ohio	37	7,531	7,568	7,970	48	7,672	7,720	7,861
Indiana	13	3,444	3,458	3,951	13	3,995	4,008	4,277
Illinois	32	3,464	3,496	4,113	32	3,693	3,725	4,329
Michigan	32	5,927	5,960	6,919	25	7,063	7,088	7,879
Wisconsin	44	1,916	1,960	2,282	42	2,190	2,232	2,532
Minnesota	74	2,647	2,722	3,209	86	3,756	3,842	3,994
Iowa	60	4,639	4,699	5,505	61	3,998	4,059	5,983
Missouri	49	5,146	5,195	5,724	48	5,125	5,173	5,807
North Dakota	57	1,356	1,413	2,022	63	2,155	2,218	2,693
South Dakota	57	2,725	2,783	3,139	59	3,048	3,107	3,861
Nebraska	25	3,927	3,953	4,806	26	3,959	3,985	5,687
Kansas	15	2,203	2,218	2,820	15	2,996	3,011	3,375
North Central	495	44,929	45,424	52,459	518	49,650	50,168	58,278
Delaware		8	8	8		9	9	9
Maryland	8	694	702	726	8	814	822	873
Virginia	45	2,742	2,788	2,982	58	3,046	3,104	3,406
West Virginia	37	2,918	2,955	3,766	48	3,298	3,346	3,582
North Carolina	15	228	243	260	17	286	303	326
South Carolina	1	31	33	32	3	33	36	32
Georgia	9	87	96	88	11	67	78	86
Florida		51	51	49		53	53	53
South Atlantic	115	6,760	6,875	7,913	145	7,606	7,751	8,367
Kentucky	52	5,523	5,575	6,047	77	7,207	7,284	7,588
Tennessee	33	1,768	1,801	1,906	46	2,189	2,235	2,294
Alabama	6	77	83	98	7	57	64	129
Mississippi	11	158	169	96	5	92	97	60
Arkansas	7	153	159	146	8	166	174	148
Louisiana	14	108	122	113	18	94	112	125
Oklahoma	14	221	235	311	13	303	316	411
Texas	93	5,662	5,756	8,604	100	5,697	5,797	9,768
South Central	230	13,670	13,900	17,322	274	15,805	16,079	20,523
Montana	102	8,658	8,760	11,646	133	9,626	9,759	14,018
Idaho	103	9,703	9,806	10,997	110	11,322	11,432	12,940
Wyoming	102	9,023	9,125	10,711	115	10,012	10,127	12,410
Colorado	147	8,219	8,365	9,126	147	9,264	9,411	9,526
New Mexico	414	4,885	5,299	5,840	435	4,591	5,026	5,061
Arizona	750	2,880	3,630	3,501	780	3,204	3,984	3,772
Utah	231	8,731	8,961	9,718	257	9,777	10,034	11,240
Nevada	119	3,885	4,006	4,316	136	4,074	4,210	4,455
Washington	30	2,765	2,794	3,060	32	3,153	3,185	3,395
Oregon	87	8,359	8,446	9,388	88	9,507	9,595	10,764
California	138	12,353	12,491	13,956	131	14,967	15,098	17,358
Far Western	2,224	79,460	81,684	92,259	2,364	89,497	91,861	104,939
United States	3,136	149,986	153,122	175,180	3,372	168,266	171,638	197,570

Bureau of Agricultural Economics. Estimates division Crop and Livestock Estimates.

[1] Preliminary.

TABLE 413.—*Wool, raw: Production, imports, exports, and amount available for consumption, United States, 1910–1929*

Year	Production			Imports [1]	Reexports [1]	Exports of domestic wool	Net imports [2]	Available for consumption
	Fleece	Pulled	Total					
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1910	281, 363	40, 000	321, 363	180, 135	9, 055	[3] 48	171, 032	492, 395
1911	277, 548	41, 000	318, 548	155, 923	3, 511	(4)	152, 412	470, 960
1912	262, 543	41, 500	304, 043	238, 118	1, 816	(5)	236, 302	540, 345
1913	252, 675	43, 500	296, 175	151, 581	3, 860	[3] 77	147, 644	443, 819
1914	247, 192	43, 000	290, 192	256, 501	6, 342	[3] 335	249, 823	540, 015
1915	245, 726	40, 000	285, 726	402, 611	2, 081	[3] 8, 158	392, 372	678, 098
1916	244, 890	43, 600	288, 490	442, 650	2, 128	3, 919	436, 603	725, 093
1917	241, 892	40, 000	281, 892	416, 137	1, 272	1, 827	413, 038	694, 930
1918	256, 870	42, 000	298, 870	447, 426	452	407	446, 567	745, 437
1919	249, 958	48, 300	298, 258	438, 782	5, 134	2, 840	430, 807	729, 065
1920	244, 179	42, 900	287, 079	254, 905	12, 393	8, 845	233, 666	520, 745
1921	235, 129	48, 500	283, 629	316, 605	1, 552	1, 927	313, 126	596, 755
1922	221, 713	42, 000	263, 713	366, 538	4, 225	453	361, 861	625, 574
1923	225, 696	42, 500	268, 196	388, 345	23, 557	535	364, 253	632, 449
1924	235, 575	43, 800	279, 375	262, 655	27, 476	309	234, 869	514, 244
1925	245, 562	46, 800	292, 362	336, 646	7, 087	273	329, 286	621, 648
1926	260, 976	50, 600	311, 576	299, 451	14, 082	292	285, 077	596, 653
1927	281, 914	50, 100	332, 014	264, 507	10, 710	323	253, 474	585, 488
1928	303, 715	51, 900	355, 615	240, 360	4, 435	485	235, 440	591, 055
1929 [6]	308, 947	54, 500	363, 447	277, 204	2, 380	239	274, 585	638, 032

Bureau of Agricultural Economics. Production figures 1910–1913 from the National Association of Wool Manufacturers; 1914–1928 from the bureau; imports and exports from the Bureau of Foreign and Domestic Commerce.

[1] Hair of Angora goat, alpaca, and other like animals included in imports and reexports prior to 1914 and in exports for all years.
[2] Total imports minus domestic exports and reexports.
[3] Exports for fiscal years ended June 30 of the years shown.
[4] Included in all other articles.
[5] No transactions.
[6] Preliminary.

TABLE 414.—*Wool, fleece: Estimated production, by States, 1926–1929*

State and division	Production				Weight per fleece [1]				Number of fleeces [2]			
	1926	1927	1928	1929 [3]	1926	1927	1928	1929 [3]	1926	1927	1928	1929 [3]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Lbs.*	*Lbs.*	*Lbs.*	*Lbs.*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Maine	559	546	542	533	6.5	6.5	6.3	6.2	86	84	86	86
New Hampshire	110	117	115	112	6.5	6.5	6.4	6.2	17	18	18	18
Vermont	277	285	280	291	7.3	7.3	7.0	7.1	38	39	40	41
Massachusetts	62	63	66	65	6.2	6.3	6.6	6.5	10	10	10	10
Rhode Island	12	12	13	13	6.2	6.2	6.4	6.4	2	2	2	2
Connecticut	43	36	42	42	6.1	6.0	6.0	6.0	7	6	7	7
New York	3,081	2,956	2,966	2,765	7.3	7.3	7.2	7.2	422	405	412	384
New Jersey	32	32	30	30	6.3	6.3	6.1	6.1	5	5	5	5
Pennsylvania	2,805	2,730	2,948	3,017	7.5	7.5	7.5	7.6	374	364	393	397
North Atlantic	6,981	6,777	7,002	6,868	7.3	7.3	7.2	7.2	961	933	973	950
Ohio	14,760	15,662	15,826	15,512	8.2	8.2	8.2	8.1	1,800	1,910	1,930	1,915
Indiana	3,715	4,088	4,307	4,644	7.4	7.3	7.3	7.2	502	560	590	645
Illinois	3,648	4,162	3,724	3,600	7.6	7.5	7.6	7.5	480	555	490	480
Michigan	7,920	8,272	8,520	8,580	8.0	8.0	8.0	7.8	990	1,034	1,065	1,100
Wisconsin	2,508	2,774	2,808	2,734	7.6	7.6	7.8	7.7	330	365	360	355
Minnesota	3,634	4,211	4,661	4,938	7.9	7.9	7.9	7.9	460	533	590	625
Iowa	5,440	5,896	5,960	6,202	8.0	8.0	8.0	7.9	680	737	745	785
Missouri	5,250	5,523	5,962	6,000	7.0	7.0	7.2	7.1	750	789	828	845
North Dakota	2,772	3,469	3,984	4,403	8.3	8.3	8.3	8.2	334	418	480	537
South Dakota	4,714	5,160	5,644	5,636	8.1	8.0	8.3	7.7	582	645	680	732
Nebraska	2,175	2,442	2,370	2,668	7.5	6.6	7.9	7.6	290	370	300	351
Kansas	1,679	1,986	2,442	2,467	7.3	7.3	7.4	7.3	230	272	330	338
North Central	58,215	63,645	66,208	67,384	7.8	7.8	7.9	7.7	7,428	8,188	8,388	8,708
Delaware	12	12	12	12	6.0	6.0	6.0	6.0	2	2	2	2
Maryland	472	504	518	573	6.3	6.3	6.1	6.3	75	80	85	91
Virginia	1,630	1,710	1,895	2,194	5.0	5.0	5.0	5.2	326	342	379	422
West Virginia	2,311	2,457	2,684	2,798	5.3	5.4	5.4	5.3	436	455	497	528
North Carolina	304	350	357	376	4.6	4.8	4.7	4.7	66	73	76	80
South Carolina	45	50	52	52	4.1	4.2	4.0	4.0	11	12	13	13
Georgia	139	148	126	125	3.4	3.6	3.4	3.3	41	41	37	38
Florida	144	144	153	150	3.0	3.0	3.0	3.0	48	48	51	50
South Atlantic	5,057	5,375	5,797	6,280	5.0	5.1	5.1	5.1	1,005	1,053	1,140	1,224
Kentucky	3,278	3,845	4,051	4,305	4.8	4.8	4.7	4.7	683	801	862	916
Tennessee	1,118	1,174	1,287	1,312	4.3	4.3	4.1	4.1	260	273	314	320
Alabama	136	155	184	221	3.5	3.6	3.4	3.4	39	43	54	65
Mississippi	288	198	115	96	3.2	3.2	3.1	3.1	90	62	37	31
Arkansas	201	220	207	202	4.9	4.9	4.6	4.8	41	45	45	42
Louisiana	275	286	282	306	3.2	3.4	3.2	3.4	86	84	88	90
Oklahoma	456	562	615	664	7.6	7.7	7.5	7.3	60	73	82	91
Texas	27,297	32,725	35,591	39,882	8.1	8.5	8.4	8.5	3,370	3,850	4,237	4,692
South Central	33,049	39,165	42,332	46,988	7.1	7.5	7.4	7.5	4,629	5,231	5,719	6,247
Montana	23,320	24,166	26,626	29,077	8.8	8.6	8.6	8.6	2,650	2,810	3,096	3,381
Idaho	14,507	15,840	17,885	17,829	8.9	8.8	9.2	8.8	1,630	1,800	1,944	2,026
Wyoming	22,338	25,317	26,488	24,200	8.5	8.7	8.8	8.0	2,628	2,910	3,010	3,025
Colorado	7,740	8,118	8,831	8,655	7.5	7.3	7.6	7.1	1,032	1,112	1,162	1,219
New Mexico	12,060	12,600	12,400	12,882	5.9	6.0	5.8	6.0	2,044	2,100	2,138	2,147
Arizona	6,758	6,240	5,760	5,784	6.2	6.0	6.0	6.0	1,090	1,040	960	964
Utah	19,430	19,975	22,072	19,764	8.8	8.5	8.9	8.1	2,208	2,350	2,480	2,440
Nevada	8,730	8,015	8,580	7,560	7.9	7.3	7.5	7.0	1,105	1,098	1,144	1,080
Washington	4,194	4,753	5,000	4,554	9.8	9.8	10.0	9.0	428	485	500	506
Oregon	18,321	18,128	20,332	18,849	9.3	8.8	9.2	8.3	1,970	2,060	2,210	2,271
California	20,276	23,800	23,800	25,192	7.4	7.0	6.8	6.7	2,740	3,400	3,500	3,760
Far Western	157,674	166,952	177,774	174,346	8.1	7.9	8.0	7.6	19,525	21,165	22,144	22,819
United States	260,976	281,914	299,113	301,866	7.8	7.7	7.8	7.6	33,548	36,570	38,364	39,948

Bureau of Agricultural Economics. Revised figures for 1928 and 1929 may be found in March, 1930, Crops and Markets.

[1] In States where sheep are shorn twice a year, principally Texas and California, this figure covers wool per head of sheep shorn and not weight per fleece.
[2] Includes some fleeces taken at commercial feeding plants. California figure includes some fleeces taken from early lambs.
[3] Preliminary.

TABLE 415.—*Stocks of wool, tops, and noils held by dealers and manufacturers in United States, 1925–1929* [1]

Date	Held by dealers					Held by manufacturers				
	Grease	Scoured	Pulled	Tops	Noils	Grease	Scoured	Pulled	Tops	Noils
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1925										
Jan. 1	98, 712	18, 380	9, 799	3, 285	2, 583	113, 026	15, 315	7, 368	16, 258	6, 729
Apr. 1	65, 912	16, 819	12, 624	2, 754	2, 412	95, 122	15, 437	7, 025	15, 921	6, 020
July 1	147, 654	15, 039	11, 267	2, 571	3, 292	95, 021	16, 455	7, 381	15, 252	5, 463
Oct. 1	136, 043	15, 809	9, 715	2, 240	2, 704	102, 261	13, 621	6, 623	15, 880	6, 207
1926										
Jan. 1	117, 726	14, 658	10, 552	2, 428	2, 407	97, 162	12, 666	7, 852	15, 346	6, 121
Apr. 1	97, 552	15, 053	12, 360	2, 692	2, 641	95, 102	14, 358	7, 468	15, 188	6, 184
July 1	182, 685	12, 204	10, 141	2, 438	3, 090	91, 852	12, 640	6, 877	14, 104	5, 633
Oct. 1	166, 380	12, 810	8, 709	2, 310	2, 769	90, 992	12, 407	6, 376	13, 771	5, 047
1927										
Jan. 1	114, 680	13, 176	9, 029	2, 282	3, 392	90, 494	11, 699	6, 322	13, 653	5, 266
Apr. 1	81, 869	11, 923	9, 851	2, 140	3, 409	90, 805	12, 486	6, 095	13, 858	5, 045
July 1	177, 315	9, 111	7, 914	2, 864	3, 186	96, 091	12, 709	5, 758	14, 641	4, 479
Oct. 1	147, 079	9, 390	5, 075	1, 677	2, 846	103, 886	12, 937	6, 170	14, 581	4, 144
1928										
Jan. 1	97, 787	8, 775	6, 351	3, 208	2, 495	98, 577	13, 134	5, 416	13, 654	4, 542
Apr. 1	50, 989	7, 907	7, 761	2, 056	2, 305	99, 319	14, 632	7, 902	13, 447	4, 932
July 1	171, 077	10, 133	8, 393	1, 769	2, 889	105, 117	13, 363	5, 734	12, 559	4, 475
Oct. 1	170, 143	9, 695	8, 998	2, 282	2, 688	94, 752	11, 469	5, 409	12, 294	4, 428
1929										
Jan. 1	112, 142	10, 208	10, 575	1, 415	3, 842	90, 290	11, 814	4, 559	12, 051	4, 148
Apr. 1	72, 515	10, 263	9, 669	2, 379	3, 691	95, 965	12, 351	6, 290	11, 727	4, 315
July 1	147, 292	9, 413	9, 788	2, 862	3, 404	95, 208	11, 568	5, 274	11, 229	4, 481
Oct. 1	160, 786	10, 345	8, 907	2, 696	3, 624	98, 812	11, 664	5, 980	11, 852	4, 917

Bureau of Agricultural Economics. Compiled from wool stock reports issued quarterly by the Bureau of Agricultural Economics and the Bureau of the Census. Stocks held by the Government are not included.

[1] Not including estimates for firms not reporting nor wool actually reported but for which no grade was stated. Beginning with 1922 estimates for firms not reporting were discontinued. The information in this table is, therefore, not complete as some firms do not report.

NOTE.—A table similar to Table 420, 1928 Yearbook, wool used in manufactures, is omitted.

TABLE 416.—*Wool: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31							
	Average, 1909–1913		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Australia	324	676, 679	[1] 2, 542	[1] 781, 279	[1] 5, 563	[1] 763, 556		
Argentina	214	328, 204	208	318, 302	417	346, 010		276, 463
New Zealand	168	194, 801	201	213, 154	35	220, 561	89	226, 805
Union of South Africa	7	164, 635	514	222, 836	563	271, 016	943	261, 2[illegible]1
Uruguay	0	139, 178	0	118, 762	0	151, 789	0	117, 773
China	0	42, 685	725	33, 040	391	57, 510	421	73, 623
British India	23, 721	56, 496	25, 803	40, 375	32, 191	47, 292	32, 657	57, 649
Chile	1, 247	28, 223	321	24, 726		27, 407		29, 895
Algeria	2, 445	19, 871	4, 522	30, 757	3, 212	26, 662	3, 816	26, 526
Morocco	0	8, 607	0	17, 174	0	16, 074		
Irish Free State	0	0	1, 529	11, 610	1, 640	16, 469	865	12, 284
Spain	2, 466	28, 505	5, 054	6, 707	[1] 3, 774	[1] 17, 435		
Peru	[2] 3	9, 333	0	9, 200	0	11, 057	0	12, 411
Hungary	0	0	1, 529	13, 460	2, 120	9, 897	3, 351	9, 981
Persia [3]	[2] 2, 753	10, 023	1, 351	13, 490	1, 354	9, 952		
Brazil		[5] 2, 959		15, 886		11, 054		10, 161
PRINCIPAL IMPORTING COUNTRIES								
France	601, 628	84, 973	639, 786	46, 241	686, 796	59, 151	611, 755	60, 069
United Kingdom	506, 155	41, 164	484, 602	54, 395	506, 463	62, 021	463, 934	48, 195
United States	203, 298	[5] 46	310, 266	292	267, 287	323	244, 630	485
Germany	481, 988	42, 187	326, 123	16, 933	424, 775	22, 814	380, 649	26, 542
Belgium	300, 367	196, 440	115, 320	201	146, 875	156	140, 513	215
Italy	30, 145	3, 933	102, 760	8, 190	88, 744	7, 786	106, 916	8, 258
Japan	17, 921	0	73, 370	0	99, 589	0	115, 280	0
Czechoslovakia	0	0	30, 306	4, 034	39, 009	3, 586	37, 921	3, 194
Poland	0	0	25, 828	1, 349	36, 019	971	30, 487	1, 545
Russia	106, 184	32, 406	18, 305	[1] 4, 334	27, 207	[1] 3, 426	34, 354	
Canada	7, 794	1, 323	15, 378	4, 389	14, 354	11, 357	14, 271	8, 351
Austria	63, 942	9, 622	14, 348	1, 084	17, 160	879	16, 411	853
Switzerland	11, 211	338	18, 237	40	18, 887	46	17, 202	35
Netherlands	31, 991	26, 362	9, 902	2, 746	11, 839	3, 413	10, 457	2, 924
Yugoslavia	0	0	8, 146	84	7, 843	89	3, 017	248
Sweden	7, 267	149	9, 903	85	11, 623	310	11, 829	375
Bulgaria	[4] 1, 485	[4] 117	1, 859	0	2, 199	3	2, 715	
Finland	1, 794	30	2, 628		3, 533		3, 369	
Norway	3, 644	123	1, 761	331	2, 127	554	1, 717	1, 113
Denmark	2, 337	1, 124	2, 388	306	3, 287	381	2, 569	534
Greece	281	294	2, 055	599	2, 066	862	2, 387	529
Rumania	2, 473	3, 538	2, 452	653				
Total 38 countries	2, 415, 233	2, 154, 998	2, 260, 036	2, 017, 044	2, 468, 942	2, 181, 809	2, 294, 525	1, 278, 242

Bureau of Agricultural Economics. Official sources except where otherwise noted. "Wool" in this table includes: Washed, unwashed, scoured, pulled wool, slipe, also hair—goat, camel, mohair, angora goat, cashmere goat and alpaca. The following items have been considered as not within this classification: Carded, combed, dyed wool, flocks, sheep, lamb and goat skins with hair on, mill waste, noils, and tops.

[1] International Yearbook of Agricultural Statistics.
[2] 3-year average.
[3] Figures for Persia are for 12 months ended Mar. 21 of the year following year shown.
[4] 4-year average.
[5] 1 year only.

TABLE 417.—*Wool: Estimated production in the grease, average 1909–1913, annual 1924–1929*

Country	Average, 1909–1913 [1]	1924	1925	1926	1927	1928	1929, preliminary
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States.							
Fleece	272, 248	235, 575	245, 562	260, 876	281, 914	299, 113	301, 866
Pulled	41, 400	43, 800	46, 800	49, 600	50, 100	51, 900	
Total	313, 648	279, 375	292, 362	310, 576	332, 014	351, 013	
Canada	13, 188	15, 112	15, 563	17, 960	18, 673	19, 611	[2] 21, 000
United Kingdom and Irish Free State	136, 031	104, 668	109, 853	114, 567	118, 537	119, 690	117, 869
France	81, 600	44, 092	44, 974	46, 517	[2] 50, 180	[2] 49, 840	[2] 48, 580
Germany	43, 893	51, 960	50, 160	41, 830	35, 900	[2] 33, 600	[2] 31, 900
Argentina	332, 321	316, 000	319, 000	363, 000	331, 000	343, 000	[3] 330, 000
Uruguay	133, 101	97, 000	116, 000	129, 000	131, 000	139, 000	[3] 150, 000
Australia	727, 709	776, 882	833, 739	924, 411	888, 130	950, 000	[3] 925, 000
New Zealand [4]	179, 942	208, 269	200, 205	202, 386	228, 960	239, 002	[2] 255, 000
Union of South Africa	157, 690	175, 718	235, 081	249, 159	273, 000	283, 000	[3] 302, 000
Total above countries [5]	2, 077, 713	2, 025, 276	2, 170, 127	2, 349, 806	2, 357, 294	2, 475, 856	2, 483, 215
Estimated world total, excluding Russia and China [6]	2, 762, 000	2, 728, 000	2, 903, 000	3, 089, 000	3, 087, 000	3, 207, 000	
Russia	[7] 330, 311	164, 700	261, 000	301, 800	329, 800	350, 250	
China, exports	37, 318	64, 709	56, 817	27, 791	48, 037	64, 845	

Bureau of Agricultural Economics. Includes wool shorn in the spring in the Northern Hemisphere and that shorn in the last few months of the same calendar year in the Southern Hemisphere. For complete reference to sources, unless given below, see Foreign Crops and Markets, Feb. 11, 1929.

[1] Average for years 1909–1913 whenever available, otherwise for any year or years within or near this period for which estimates are available.
[2] Based on official estimates of sheep numbers at date nearest shearing time.
[3] Estimate furnished by International Institute of Agriculture.
[4] Dalgety & Co.'s estimate.
[5] Excluding pulled wool in the United States.
[6] Totals subject to revision. Few countries publish official wool production figures. In the absence of official figures for most countries various estimates have been used. Some have been supplied by Government representatives abroad; others are based on sheep numbers at the date nearest shearing time. For some principal exporting countries, exports alone, or exports, stocks, and domestic consumption have been used as representing production. In the case of some Asiatic countries rough commercial estimates have been used, while the figures of the United States Department of Commerce or the National Association of Wool Manufacturers have been used for some other countries.
[7] Year 1916.

TABLE 418.—*Wool (unwashed): Estimated price per pound, received by producers United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	24. 5	24. 6	24. 9	22. 3	22. 8	19. 5	19. 0	19. 5	17. 7	18. 1	17. 9	17. 8	20. 5
1911	17. 3	17. 3	16. 8	15. 7	14. 7	15. 5	15. 4	16. 0	15. 6	15. 5	15. 6	15. 5	15. 6
1912	16. 2	16. 3	16. 9	17. 3	17. 8	18. 7	18. 9	18. 8	18. 7	18. 5	18. 6	18. 6	18. 1
1913	18. 6	18. 7	18. 4	17. 7	16. 3	15. 6	15. 9	15. 8	15. 8	15. 5	15. 6	16. 1	16. 4
1914	15. 7	15. 7	16. 4	16. 8	17. 2	18. 4	18. 5	18. 7	18. 6	18. 0	18. 1	18. 6	17. 7
1915	18. 6	20. 2	22. 8	22. 7	22. 0	23. 7	24. 2	23. 8	23. 3	22. 7	22. 7	23. 3	22. 8
1916	23. 3	24. 2	25. 9	26. 3	28. 0	28. 7	28. 6	29. 0	28. 4	28. 7	29. 4	30. 8	27. 9
1917	31. 8	32. 7	36. 7	38. 8	43. 7	49. 8	54. 3	54. 8	54. 2	55. 5	55. 9	58. 2	47. 8
1918	58. 1	57. 1	60. 0	60. 0	58. 2	57. 4	57. 5	57. 4	57. 7	57. 7	56. 4	56. 2	57. 9
1919	55. 2	51. 1	51. 3	47. 9	48. 0	50. 5	51. 8	52. 2	51. 3	50. 6	51. 0	51. 6	50. 3
1920	53. 3	52. 5	51. 5	51. 3	50. 3	38. 6	29. 5	28. 3	28. 0	27. 5	24. 9	21. 9	39. 1
1921	19. 6	19. 8	18. 9	17. 9	16. 0	15. 4	15. 5	15. 4	15. 5	15. 8	15. 6	16. 9	16. 4
1922	18. 0	22. 3	25. 0	24. 8	29. 0	32. 8	32. 5	31. 6	31. 6	32. 2	33. 2	35. 3	29. 8
1923	35. 3	35. 3	37. 3	39. 2	41. 7	41. 5	38. 3	37. 0	37. 1	36. 9	36. 4	36. 2	38. 9
1924	36. 6	37. 5	38. 2	38. 4	37. 4	36. 0	34. 3	33. 5	35. 5	37. 3	40. 1	42. 2	36. 9
1925	42. 8	43. 2	43. 0	40. 8	36. 9	35. 7	39. 4	38. 1	37. 8	37. 2	37. 8	39. 5	38. 5
1926	38. 9	37. 7	34. 7	33. 2	32. 0	31. 4	31. 9	31. 9	32. 6	31. 6	31. 6	30. 1	32. 5
1927	30. 9	31. 1	31. 3	30. 4	30. 1	30. 2	30. 7	31. 2	31. 2	30. 9	31. 1	32. 0	30. 7
1928	33. 2	34. 4	35. 4	35. 6	37. 0	38. 7	37. 6	37. 0	36. 5	36. 0	35. 9	35. 6	36. 7
1929	35. 9	35. 9	35. 5	33. 8	31. 3	30. 2	29. 4	29. 2	29. 0	28. 6	28. 5	27. 8	30. 9

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of sheep Jan. 1, by States; yearly price obtained by using estimates of the division of crop and livestock estimates and the division of statistical and historical research.

TABLE 419.—*Wool, scoured basis, territory, grades 64s, 70s, 80s (fine strictly combing): Average price per pound, Boston market, 1900–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1900	64	64	61	59	58	56	54	52	51	51	50	50	56
1901	50	49	46	46	46	46	46	46	46	46	46	48	47
1902	48	49	50	50	50	50	50	50	52	52	52	55	51
1903	56	56	56	56	54	54	54	54	54	54	54	54	55
1904	54	54	52	52	54	57	58	60	64	65	68	69	59
1905	69	69	68	69	72	73	74	74	74	74	74	74	72
1906	74	72	72	72	72	72	70	70	70	70	70	70	71
1907	70	70	70	70	70	70	70	72	72	72	70	69	70
1908	68	66	64	62	54	56	56	57	57	58	60	62	60
1909	63	64	64	65	66	70	74	76	76	76	76	75	70
1910	74	73	71	68	63	61	61	62	62	63	63	63	65
1911	61	59	54	53	52	52	55	56	59	60	61	61	57
1912	61	61	61	61	61	61	63	68	68	68	67	67	64
1913	66	64	59	56	55	54	54	54	54	53	53	52	56
1914	52	56	57	59	60	61	61	63	61	59	61	61	59
1915	63	73	73	71	69	71	71	71	71	71	71	73	71
1916	74	77	77	79	79	81	82	85	89	89	97	105	84
1917	113	123	128	133	138	174	174	178	181	180	180	180	157
1918	180	180	183	185	180	180	185	180	180	185	180	180	182
1919	160	152	158	165	165	175	185	185	185	200	200	200	178
1920 [1]	200	205	205	200	200	175	160	145	130	120	95	90	160
1921	84	90	89	88	86	82	82	82	82	82	84	88	85
1922	97	110	110	109	127	134	135	131	130	134	139	140	125
1923	143	144	144	149	153	150	144	137	132	130	130	134	141
1924	139	139	142	138	135	129	130	137	142	147	154	164	141
1925	168	164	153	138	126	130	137	132	129	128	131	131	139
1926	127	124	118	116	112	110	116	116	116	116	114	110	116
1927	110	110	110	109	108	108	111	111	111	112	112	112	110
1928	116	116	116	117	119	120	120	115	112	112	113	114	116
1929	114	111	108	104	100	97	94	94	93	90	88	84	98

Bureau of Agricultural Economics. 1900–1920 prices from quarterly reports of the National Association of Wool Manufacturers. 1921–1923 average of weekly range quotations from the Boston Commercial Bulletin and 1924–1929 from the livestock and meat reporting service of the bureau.

[1] Prices June–December, 1920, largely nominal.

TABLE 420.—*Wool, scoured basis, territory, grade 56s (3/8-blood strictly combing): Average price per pound, Boston market, 1900–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1900	54	54	52	49	48	46	46	45	44	43	43	42	47
1901	42	41	39	39	38	36	36	37	38	38	39	39	39
1902	39	39	39	39	39	41	41	41	42	42	42	43	41
1903	43	43	43	43	42	42	42	42	42	42	42	42	43
1904	44	45	45	45	48	50	50	52	52	54	56	59	50
1905	59	59	58	58	62	64	66	67	68	68	66	66	63
1906	65	64	64	64	64	64	64	62	62	62	62	62	63
1907	61	61	61	61	61	61	61	61	61	61	56	54	60
1908	51	48	46	44	42	42	42	42	42	44	47	50	45
1909	52	53	54	54	56	60	64	66	66	66	66	65	60
1910	69	61	60	57	56	56	56	57	57	56	54	53	58
1911	54	54	52	49	49	50	50	52	52	48	46	48	50
1912	51	52	51	51	51	52	58	58	58	58	58	58	55
1913	58	58	55	50	49	48	48	48	48	47	46	45	50
1914	43	47	47	47	50	52	52	49	48	49	51	53	49
1915	56	63	66	66	66	66	66	68	68	68	67	69	66
1916	70	71	71	71	72	74	76	78	79	80	87	90	77
1917	91	100	102	110	118	132	132	138	146	148	148	148	126
1918	148	149	152	152	142	142	(1)	(1)	(1)	(1)	(1)	(1)	------
1919	126	121	121	110	118	120	128	137	138	127	130	135	126
1920	135	135	131	130	125	112	99	95	88	74	65	56	104
1921	53	55	55	54	53	50	51	52	52	52	54	58	53
1922	63	76	77	74	83	88	88	90	92	95	99	98	85
1923	100	103	105	107	111	111	109	105	103	101	104	108	106
1924	113	116	116	113	109	97	100	109	113	117	122	133	113
1925	136	136	125	109	96	99	105	101	102	102	108	109	111
1926	103	99	93	91	89	89	90	90	91	93	93	91	92
1927	90	90	90	90	88	88	90	91	91	94	94	94	91
1928	97	99	100	106	107	108	107	103	104	104	104	104	104
1929	104	104	101	95	89	88	88	90	90	89	87	82	92

[1] No quotations.

TABLE 421.—*Wool, grease basis, Ohio and similar, grade 56s (3/8-blood strictly combing): Average price per pound, Boston market, 1900–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1900	29	28	27	27	26	25	25	24	24	24	23	24	26
1901	24	23	23	23	22	20	20	20	21	21	21	22	22
1902	22	22	22	22	22	22	22	22	22	23	23	24	22
1903	25	25	25	23	23	24	24	24	26	26	26	26	25
1904	25	26	26	26	26	28	28	28	29	29	31	32	28
1905	32	31	30	31	35	36	36	35	35	35	35	34	34
1906	34	33	33	33	33	33	33	33	33	34	34	34	33
1907	34	34	34	33	32	32	33	33	33	33	31	30	33
1908	31	31	30	29	25	26	25	25	26	26	27	28	27
1909	29	30	31	33	34	35	36	36	37	37	37	37	34
1910	36	36	36	34	31	28	28	28	28	29	30	30	31
1911	30	29	28	25	25	25	25	25	25	25	25	25	26
1912	27	30	29	28	27	29	30	30	30	30	30	30	29
1913	31	31	30	26	24	24	24	24	24	24	23	24	26
1914	24	24	24	25	26	28	28	28	28	28	29	30	27
1915	31	35	37	37	36	36	38	38	37	36	37	38	36
1916	38	40	40	40	40	41	42	42	42	43	45	48	42
1917	49	54	56	59	63	70	74	75	76	76	76	77	67
1918	78	77	78	78	76	76	(1)	(1)	(1)	(1)	(1)	(1)	------
1919	70	65	65	61	61	63	70	71	70	68	69	70	67
1920	70	70	70	69	66	57	52	49	45	40	37	30	55
1921	29	30	30	30	29	26	26	26	26	26	28	32	28
1922	36	39	40	38	42	47	46	46	47	49	53	54	45
1923	55	56	56	56	56	57	56	54	53	52	53	54	55
1924	55	56	57	57	53	49	48	53	55	59	63	69	56
1925	70	69	66	55	46	49	53	52	50	52	54	54	56
1926	54	53	49	46	44	43	44	44	44	45	46	45	46
1927	45	45	45	44	42	42	43	44	45	46	47	48	45
1928	50	52	52	53	55	57	56	55	55	55	56	56	54
1929	56	55	54	50	45	44	45	45	45	45	44	42	48

Bureau of Agricultural Economics. 1900–1909 from quarterly reports of the National Association of Wool Manufacturers on Ohio, Pennsylvania, and West Virginia 3/8-blood, 1910–1923 from Boston Commercial Bulletin, average of weekly range on Ohio and Pennsylvania 3/8-blood, and 1924–1929 from the livestock and meat reporting service of the Bureau.

[1] No quotations.

TABLE 422.—*Wool, grades 64s–70s: Average price per pound at London, scoured basis, 1921–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	78.65	71.02	63.40	54.00	60.00	61.70	52.50	57.10	61.70	75.10	73.15	75.00	65.28
1922	82.00	84.30	84.60	90.00	95.40	94.55	96.00	102.00	101.60	107.30	108.95	106.30	96.08
1923	112.40	107.00	107.70	106.40	115.50	110.70	111.00	111.30	111.60	112.50	112.60	113.70	111.03
1924	117.90	121.80	121.60	122.00	123.15	122.68	122.20	130.75	139.30	138.00	148.40	150.30	129.84
1925	140.10	130.00	119.70	115.95	112.20	112.60	113.00	110.00	107.00	108.90	111.00	101.00	115.12
1926	97.30	97.30	97.30	98.10	97.70	97.30	94.30	94.80	95.30	93.30	92.75	90.75	95.51
1927	89.20	94.00	95.30	94.30	95.30	95.80	96.30	96.85	97.40	98.40	99.40	99.40	95.97
1928	101.40	102.00	103.40	102.40	101.40	101.40	101.40	98.35	95.30	90.00	93.30	91.20	98.46
1929	91.20	90.00	85.20	83.00	79.00	76.25	73.50	70.00	66.91	64.88	63.87	62.86	75.55

Bureau of Agricultural Economics. These data were obtained from prices given by Kreglinger and Fernau for the opening and closing of each series of the London wool sales. For months when no sales were held the figures are interpolations of nearest actual prices. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par.

Table 423.—*Wool, grade 56s: Average price per pound at London, scoured basis, 1921–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1921	43.60	45.40	38.00	36.00	40.00	36.40	31.60	35.05	38.50	39.00	36.70	39.30	38.30
1922	45.90	46.00	47.00	50.35	53.70	48.20	50.20	51.00	55.40	66.60	68.30	69.60	54.35
1923	73.00	71.90	73.45	80.00	80.90	77.00	76.60	77.10	77.60	77.60	76.20	80.00	76.78
1924	80.90	84.20	85.00	83.75	82.50	82.00	81.50	87.15	92.80	101.00	105.00	111.30	89.76
1925	105.00	90.80	89.00	80.90	72.80	73.85	74.90	70.75	66.60	66.60	66.60	66.60	77.03
1926	60.80	60.80	60.80	59.80	58.30	56.80	58.80	59.80	60.80	59.80	57.00	58.80	59.36
1927	58.80	68.00	71.00	66.00	66.90	67.40	67.90	68.40	68.90	70.95	73.00	75.00	68.52
1928	77.00	80.00	81.10	79.55	78.00	77.50	77.00	74.00	71.00	70.00	73.00	74.00	76.01
1929	75.00	69.95	63.90	61.80	58.80	56.75	54.70	52.70	50.69	46.64	50.69	50.69	57.69

Bureau of Agricultural Economics. These data were obtained from the prices given by Kreglinger and Fernau for the opening and closing of each series of the London wool sales. For months when no sales were held the figures are interpolations of nearest actual prices. Conversions at monthly average rate of exchange as given in Federal Reserve Bulletins to December, 1925, inclusive; subsequently at par.

Table 424.—*Goats and mohair: Estimates* [1] *of goats clipped, mohair clipped, and average clip per goat (principal producing States), 1920–1928*

GOATS CLIPPED

	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Texas [2]	1,834	1,984	1,750	1,797	2,008	1,857	2,367	2,579	2,800
New Mexico	124	128	110	110	127	120	135	165	170
Arizona [2]	145	145	152	160	165	162	165	185	185
California	72	74	59	57	57	58	56	52	45
Oregon	113	115	105	103	101	110	115	115	125
Missouri	58	60	55	53	60	67	61	63	66
Total	2,346	2,506	2,231	2,280	2,518	2,374	2,899	3,159	3,391

MOHAIR (INCLUDING KID HAIR) PRODUCED

	1920	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Texas	6,786	7,607	6,838	7,352	7,996	8,519	9,887	11,312	12,330
New Mexico	397	422	352	374	457	444	473	611	629
Arizona	464	479	517	560	611	599	578	685	684
California	230	244	207	211	217	220	207	203	176
Oregon	452	460	431	422	414	462	483	483	525
Missouri	145	150	143	148	162	188	171	176	178
Total	8,474	9,362	8,488	9,067	9,857	10,432	11,799	13,470	14,522

AVERAGE CLIP PER GOAT CLIPPED [3]

	1920	1921	1922	1923	1924	1925	1926	1927	1928
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Texas	3.7	3.8	3.9	4.1	4.0	4.6	4.2	4.4	4.4
New Mexico	3.2	3.3	3.2	3.4	3.6	3.7	3.5	3.7	3.7
Arizona	3.2	3.3	3.4	3.5	3.7	3.7	3.5	3.7	3.7
California	3.2	3.3	3.5	3.7	3.8	3.8	3.7	3.9	3.9
Oregon	4.0	4.0	4.1	4.1	4.1	4.2	4.2	4.2	4.2
Missouri	2.5	2.5	2.6	2.8	2.7	2.8	2.8	2.8	2.7
Average, 6 States	3.6	3.7	3.8	4.0	3.9	4.4	4.1	4.3	4.3

Bureau of Agricultural Economics.

[1] Figures for 1923, 1924, and 1925 are revisions of department's estimates previously published.
[2] Most goats clipped twice a year. In Texas, kids are clipped in the fall of year of birth. Figures include both goats and kids clipped.
[3] In States where goats are clipped twice a year figures include both spring and fall clip.

TABLE 425.—*Livestock: Number of animals slaughtered at Federal-inspected plants and number of whole carcasses condemned,*[1] *1907–1929*

Year ended June 30—	Cattle		Calves		Sheep		Goats		Swine		Horses		Total slaughter
	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	Slaughter	Condemned	
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
1907	7, 622	27. 9	1, 764	6. 4	9, 682	9. 5	52	0. 0	31, 816	105. 9			50, 935
1908	7, 116	33. 2	1, 995	5. 9	9, 703	8. 1	46	. 0	35, 113	127. 9			53, 973
1909	7, 325	35. 1	2, 047	8. 2	10, 803	10. 7	69	. 1	35, 428	86. 9			55, 672
1910	7, 962	42. 4	2, 295	7. 5	11, 150	11. 1	116	. 2	27, 656	52. 4			49, 179
1911	7, 781	39. 4	2, 220	7. 7	13, 006	10. 8	54	. 1	29, 916	59. 5			52, 977
1912	7, 532	50. 4	2, 243	8. 9	14, 209	15. 4	64	. 1	34, 966	129. 0			59, 014
1913	7, 156	50. 8	2, 098	9. 2	14, 724	16. 7	57	. 1	32, 288	173. 9			56, 323
1914	6, 724	48. 4	1, 815	6. 7	14, 959	20. 6	122	. 7	33, 290	204. 9			56, 909
1915	6, 965	52. 5	1, 736	5. 9	12, 909	17. 6	166	. 7	36, 248	213. 9			58, 023
1916	7, 404	57. 6	2, 048	6. 7	11, 986	15. 1	180	. 7	40, 483	195. 1			62, 101
1917	9, 299	78. 7	2, 680	10. 1	11, 343	16. 7	175	1. 3	40, 211	158. 5			63, 708
1918	10, 938	68. 2	3, 323	8. 1	8, 769	12. 6	150	. 4	35, 449	113. 1			58, 630
1919	11, 242	59. 5	3, 674	9. 2	11, 268	14. 4	126	. 3	44, 398	128. 8			70, 709
1920	9, 710	58. 6	4, 228	13. 8	12, 335	20. 0	77	. 1	38, 982	133. 5	1	0. 1	65, 332
1921	8, 180	46. 9	3, 896	7. 7	12, 452	12. 7	20	. 0	37, 703	122. 6	1	. 0	62, 252
1922	7, 871	55. 2	3, 924	11. 4	11, 968	10. 5	14	. 0	39, 416	160. 1	2	. 0	63, 196
1923	9, 030	73. 3	4, 338	11. 8	11, 404	13. 3	25	. 1	48, 600	196. 3	1	. 0	73, 398
1924	9, 189	83. 9	4, 668	12. 7	11, 505	12. 9	31	. 3	54, 416	232. 7	5	. 0	79, 814
1925	9, 774	92. 1	5, 185	11. 1	12, 203	12. 7	27	. 1	48, 460	180. 4	12	. 0	75, 660
1926	10, 098	103. 6	5, 312	11. 9	12, 354	14. 5	43	. 1	40, 443	143. 0	40	. 1	68, 289
1927	10, 050	83. 5	5, 080	10. 6	12, 894	16. 4	30	. 1	42, 650	173. 6	43	. 2	70, 747
1928	9, 040	69. 4	4, 774	9. 9	12, 984	15. 4	20	. 1	48, 347	154. 2	107	. 3	75, 273
1929	8, 284	61. 9	4, 526	8. 9	13, 769	20. 1	21	. 1	47, 164	139. 4	117	. 4	73, 881

Bureau of Animal Industry.

[1] The numbers of condemned carcasses are expressed in thousands and tenths; that is, the last figure represents hundreds.

NOTE.—Tables similar to Tables 429 and 430, 1928 Yearbook consumption of meats, are omitted.

TABLE 426.—*Meat and meat products prepared under Federal inspection, 1907–1929*

Year ended June 30—	Pork placed in cure	Sausage chopped	Canned meats	Lard	Lard compounds and substitutes	Oleo products	Oleomargarine	All other products	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1907	2, 248, 886	267, 760	105, 196	1, 003, 602	353, 549	283, 971	55, 694	145, 554	4, 464, 213
1908	2, 875, 997	416, 200	92, 582	1, 433, 778	436, 448	293, 425	79, 380	330, 487	5, 958, 298
1909	2, 686, 051	457, 095	123, 810	1, 308, 986	488, 249	295, 889	91, 068	1, 340, 289	6, 791, 437
1910	2, 216, 680	485, 864	127, 263	948, 468	671, 526	296, 429	139, 158	1, 338, 576	6, 223, 964
1911	2, 568, 149	488, 814	144, 942	1, 185, 503	672, 845	330, 688	117, 848	1, 425, 444	6, 934, 233
1912	2, 633, 752	523, 893	153, 871	1, 309, 140	648, 443	297, 038	128, 319	1, 585, 103	7, 279, 559
1913	2, 545, 358	531, 626	115, 237	1, 222, 857	670, 802	264, 705	145, 356	1, 598, 869	7, 094, 810
1914	2, 568, 335	542, 017	120, 473	1, 187, 963	590, 409	274, 625	143, 999	1, 605, 475	7, 033, 296
1915	2, 913, 328	502, 675	235, 963	1, 277, 734	520, 899	273, 049	145, 931	1, 663, 491	7, 533, 070
1916	2, 922, 381	565, 047	164, 200	1, 277, 870	397, 089	287, 047	152, 388	1, 708, 972	7, 474. 994
1917	2, 918, 211	635, 860	283, 319	1, 119, 315	466, 198	279, 197	225, 074	1, 736, 459	7, 663, 633
1918	3, 132, 549	624, 827	468, 633	943, 851	453, 164	263, 630	265, 335	1, 743, 196	7, 905, 185
1919	3, 717, 838	667, 602	632, 259	1, 256, 043	469, 732	266, 808	251, 170	1, 907, 590	9, 169, 042
1920	2, 903, 854	682, 521	211, 521	1, 316, 918	328, 567	364, 992	217, 561	1, 749, 224	7, 755, 158
1921	2, 501, 885	583, 777	86, 240	1, 487, 820	339, 366	253, 397	151, 638	1, 723, 697	7, 127, 820
1922	2, 725, 031	568, 626	109, 481	1, 659, 331	312, 014	268, 034	118, 197	1, 666, 402	7, 427, 116
1923	3, 366, 258	679, 315	160, 132	2, 017, 939	336, 843	278, 137	129, 767	1, 920, 156	8, 888, 547
1924	3, 502, 368	707, 323	183, 026	2, 110, 660	363, 320	259, 008	142, 881	2, 136, 254	9, 404, 840
1925	3, 176, 714	736, 877	214, 330	1, 733, 933	458, 518	287, 271	133, 836	2, 170, 598	8, 912, 077
1926	2, 850, 622	771, 655	214, 167	1, 598, 754	543, 913	275, 636	148, 331	2, 008, 004	8, 411, 082
1927	2, 920, 206	765, 074	248, 459	1, 691, 344	535, 175	280, 641	148, 384	1, 977, 161	8, 566, 444
1928	3, 033, 861	777, 606	254, 769	1, 845, 129	472, 604	237, 228	151, 990	2, 201, 132	8, 974, 319
1929	2, 992, 898	785, 463	281, 743	1, 817, 601	467, 077	228, 531	158, 881	2, 214, 503	8, 946, 697

Bureau of Animal Industry. The above figures do not represent production, as a product may be inspected more than once in course of further manufacture.

TABLE 427.—*Meat and meat products: International trade, average 1911–1913, annual 1925–1928*

Country	Year ended Dec. 31							
	Average 1911–1913		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Argentina	3,487	1,173,461	424	2,087,359	477	2,280,405	----------	1,745,009
Australia	1,967	507,143	[1] 5,506	[1] 422,134	[1] 5,349	[1] 321,643	[1] 8,332	[1] 310,436
Brazil	54,012	1,520	9,372	30,033	3,103	90,872	----------	169,013
Canada	43,327	60,242	25,247	157,473	18,287	159,297	26,462	114,864
Chile	11,738	19,728	6,147	32,650	----------	36,898	----------	43,564
China	85	64,684	4,560	53,844	3,040	47,348	4,385	44,153
Denmark	32,184	368,188	24,642	551,033	33,205	628,919	16,045	700,488
Hungary	0	0	6,140	62,623	9,476	25,768	10,817	14,861
Irish Free State	0	0	73,891	88,199	66,667	105,423	57,194	135,551
Netherlands	359,864	497,402	224,127	495,723	216,180	608,075	180,100	558,807
New Zealand	960	326,539	1,064	398,502	943	441,127	1,062	436,639
Rumania	321	3,546	1,696	41,241	----------	----------	----------	----------
Sweden	24,215	39,768	38,009	46,333	31,635	73,202	28,917	65,576
Union of South Africa	31,103	404	10,786	37,122	18,040	15,253	16,313	18,550
United States	18,719	1,277,524	102,626	1,445,219	161,302	1,290,979	193,993	1,335,782
Uruguay	[2] 702	196,911	0	447,200	0	428,056	0	333,930
Yugoslavia	0	0	6,937	37,524	9,670	23,731	10,494	21,205
PRINICPAL IMPORTING COUNTRIES								
Austria	[3] 49,268	[3] 12,420	120,383	8,245	118,728	7,721	127,709	11,400
Belgium	179,120	127,057	213,887	84,087	215,234	52,734	167,847	56,031
British India	14,775	2,024	17,641	1,230	12,482	1,114	11,158	1,390
British Malaya	9,703	0	14,420	2,295	15,266	2,256	16,549	2,536
Cuba	128,362	0	179,365	0	181,505	0	----------	----------
Czechoslovakia	0	0	113,617	9,358	94,459	10,054	85,941	10,569
Egypt	4,689	0	6,651	115	6,246	110	7,737	108
Finland	14,973	2,081	20,021	7,728	19,917	3,905	19,598	1,646
France	111,496	98,281	310,163	47,366	402,140	58,250	218,892	77,882
Germany	559,752	19,525	937,666	34,937	899,275	37,320	703,255	48,022
Italy	104,619	15,708	205,120	35,575	198,584	18,339	215,357	13,027
Japan	11,727	0	74,779	0	74,539	0	67,883	368
Norway	42,416	3,365	38,685	3,096	29,542	2,644	28,617	2,715
Peru	7,859	110	15,873	230	12,924	155	----------	1,200
Philippine Islands	21,902	0	19,574	0	20,578	0	19,767	0
Poland	0	0	22,857	79,412	48,872	63,266	68,364	64,673
Spain	37,974	3,200	26,332	70,952	23,949	----------	----------	----------
Switzerland	60,174	3,169	30,010	3,208	31,242	3,218	30,850	3,335
United Kingdom	2,843,605	117,226	3,839,985	126,400	3,854,368	148,826	3,814,659	50,803
Total	4,785,098	4,941,226	6,748,203	6,948,446	6,837,224	7,040,908	6,158,296	6,394,133
Totals by kinds of meat:								
Beef	2,023,704	2,161,464	3,146,747	3,188,028	3,104,568	3,210,056	2,623,058	2,371,528
Mutton	610,820	559,795	659,902	581,958	692,705	662,307	688,828	586,272
Pork	1,585,242	1,604,439	2,203,740	2,199,028	2,267,140	2,297,466	2,109,017	2,370,816
Other	565,332	615,528	737,804	979,432	772,811	871,079	737,393	1,065,517
Total	4,785,098	4,941,226	6,748,203	6,948,446	6,837,224	7,040,908	6,158,296	6,394,133

Bureau of Agricultural Economics. Official sources.

[1] Year ended June 30.
[2] One year only.
[3] Average for Austria-Hungary.

TABLE 428.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1929*

BEEF AND VEAL

Year and month	Chicago							New York						
	Steer beef							Steer beef						
	Choice		Good					Choice		Good				
	700 pounds up	550 to 700 pounds	700 pounds up	550 to 700 pounds	Medium 500 pounds up	Cow beef, good	Vealers,[1] good	700 pounds up	550 to 700 pounds	700 pounds up	550 to 700 pounds	Medium 500 pounds up	Cow beef, good	Vealers,[1] good
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dols.*
July	23.22	23.71	22.21	22.67	20.74	18.85	22.84	23.50	23.74	22.71	22.84	20.03	19.39	22.42
August	23.48	24.33	22.48	23.13	20.50	18.50	25.48	25.41	25.94	24.41	24.34	20.46	19.85	26.00
September	25.01	25.90	24.09	24.48	21.24	18.62	26.68	26.99	27.39	25.26	25.14	20.65	19.66	26.89
October	24.53	25.30	23.06	23.30	18.91	16.52	23.24	26.34	26.54	24.12	23.98	19.78	17.61	24.65
November	23.40	24.44	21.83	22.49	19.24	16.74	21.70	24.64	25.19	22.41	22.90	19.70	17.15	22.96
December	22.78	23.55	20.55	21.21	18.22	15.85	20.84	23.68	24.20	21.26	21.64	19.01	17.12	19.95
Average, 6 months	23.74	24.54	22.37	22.88	19.81	17.51	23.46	25.09	25.50	23.36	23.47	19.94	18.46	23.81
1929														
January	22.17	23.11	20.18	20.96	18.34	17.08	24.01	22.02	22.91	20.17	20.79	18.70	17.49	26.10
February	19.91	20.26	18.31	18.48	16.99	16.06	23.38	20.64	20.96	18.94	19.09	17.54	16.61	23.70
March	20.28	21.19	19.18	19.90	18.60	16.86	23.52	20.96	21.42	19.62	19.94	18.46	17.36	23.50
April	20.75	21.55	19.75	20.51	19.09	17.89	20.65	22.35	22.70	21.56	21.68	20.30	19.05	21.68
May	21.70	22.70	21.20	21.92	20.67	19.49	22.92	22.65	22.97	21.92	22.21	20.67	19.87	21.26
June	22.25	23.22	21.50	22.48	21.25	19.70	23.65	23.48	23.66	22.76	22.94	21.55	20.55	24.68
July	23.54	24.07	22.54	23.01	21.54	19.08	24.05	24.94	24.99	24.07	24.00	21.22	20.79	26.04
August	23.48	23.75	22.74	22.79	19.40	17.56	24.72	24.88	25.12	23.28	23.28	19.04	17.75	26.08
September	23.05	23.45	21.80	22.26	18.45	16.87	24.24	24.64	24.72	22.77	22.77	18.72	16.98	26.32
October	22.41	23.35	21.21	21.78	17.69	16.02	21.51	23.81	23.85	21.40	21.40	17.57	16.20	23.44
November	21.95	22.40	20.25	20.34	17.65	15.24	20.29	22.30	22.38	20.36	20.14	17.16	15.76	22.98
December	21.68	23.01	19.86	20.71	17.79	15.56	21.38	22.80	22.90	20.98	20.98	19.10	16.85	23.24
Average	21.93	22.67	20.71	21.26	18.96	17.28	22.86	22.96	23.22	21.49	21.60	19.17	17.94	24.08

[1] Hide on.

TABLE 428.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1929*—Continued

PORK CUTS

Year and month	Chicago						New York					
	Fresh pork			Cured pork and lard			Fresh pork			Cured pork and lard		
	Hams, 10 to 14 pounds	Loins, 12 to 15 pounds	Shoulders, New York style, skinned, 8 to 12 pounds	Hams, smoked, regular No. 2, 14 to 16 pounds	Bacon, No. 1, smoked, dry cure, 6 to 8 pounds	Lard, refined (hardwood tubs)	Hams, 10 to 14 pounds	Loins, 12 to 15 pounds	Shoulders, New York style, skinned, 8 to 12 pounds	Hams, smoked, regular No. 2, 10 to 12 pounds	Bacon, No. 1, smoked, sweet-pickle cure, 8 to 10 pounds	Lard, refined (hardwood tubs)
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
August	23.60	25.56	19.55	26.00	31.00	14.70	23.70	25.28	20.34	25.00	22.30	14.77
September	23.80	27.69	22.64	26.00	31.75	15.25	25.00	28.02	22.32	25.44	24.25	14.81
October	20.20	20.58	17.96	24.86	31.40	14.40	22.90	21.94	20.80	25.60	25.30	15.00
November	18.21	19.14	15.16	24.00	29.10	13.62	20.00	20.58	16.32	24.47	22.27	14.00
December	18.85	15.19	12.82	23.88	28.00	12.88	19.00	15.75	14.25	23.64	20.55	13.50
Average, 5 months	20.93	21.63	17.63	24.95	30.25	14.17	22.12	22.31	18.81	24.83	22.93	14.42
1929												
January	19.76	17.40	14.07	23.50	28.00	12.75	21.00	17.13	15.02	22.44	19.20	13.65
February	20.42	18.18	14.71	23.38	28.38	12.75	21.50	18.46	16.34	21.58	19.22	13.62
March	21.78	23.38	17.35	23.50	29.25	13.31	24.50	23.25	18.59	22.88	20.82	14.00
April	22.90	22.41	17.04	24.25	30.38	13.25	25.25	22.25	18.65	23.25	21.00	13.50
May	21.64	22.20	16.37	24.16	30.16	12.85	24.05	22.18	17.84	23.45	21.20	13.50
June	23.00	20.44	15.66	24.62	30.52	12.85	24.25	21.05	17.78	24.81	22.70	13.50
July	23.68	22.09	17.28	26.14	31.96	13.22	25.00	23.32	18.80	27.25	24.00	13.50
August	23.05	24.32	17.68	26.25	32.12	13.56	25.50	25.01	19.70	27.18	24.00	14.25
September	23.05	24.31	17.34	25.08	31.75	13.81	24.25	25.80	19.40	25.32	24.75	14.25
October	20.22	22.86	16.20	23.95	31.42	13.17	21.98	23.30	17.89	23.98	24.14	13.80
November	17.60	18.30	14.86	22.68	29.23	12.21	20.88	20.22	16.70	22.38	23.50	13 75
December	18.40	18.16	14.30	21.65	28.80	11.94	19.25	17.90	15.91	22.00	22.00	13.03
Average	21.29	21.17	16.07	24.10	30.16	12.97	23.12	21.66	17.72	23.88	22.21	13.70

TABLE 428.—*Meats, western dressed, fresh and smoked: Average wholesale price per 100 pounds at Chicago and New York, by months, July, 1928, to December, 1929*—Continued

LAMB AND MUTTON

Year and month	Chicago							New York						
	Lamb						Mutton, good, 70 pounds down	Lamb						Mutton, good, 70 pounds down
	Choice		Good		Medium, 38 pounds down	Common, 38 pounds down		Choice		Good		Medium, 38 pounds down	Common, 38 pounds down	
	38 pounds down	39 to 45 pounds	38 pounds down	39 to 45 pounds				38 pounds down	39 to 45 pounds	38 pounds down	39 to 45 pounds			
1928	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dols.*
July	30.20	29.92	28.50	28.22	25.25	22.18	16.00	28.89	28.00	27.44	26.88	24.89	21.90	15.16
August	28.04	27.64	26.40	26.00	23.94	20.94	15.72	27.38	27.38	26.32	26.32	24.26	21.74	15.06
September	27.05	27.08	25.72	25.72	23.28	20.79	14.55	28.08	28.08	26.98	26.98	25.26	22.95	14.45
October	23.66	23.64	22.56	22.54	20.88	18.80	12.52	25.14	25.14	23.84	23.84	22.30	20.40	12.92
November	23.49	23.49	22.30	22.30	20.52	18.50	12.20	24.18	24.18	22.78	22.75	21.00	18.92	12.12
December	24.12	24.12	23.05	23.05	21.64	19.94	12.98	24.30	24.10	22.68	22.58	21.03	19.06	12.54
Average, 6 months	26.09	25.98	24.76	24.64	22.58	20.19	14.00	26.33	26.15	25.01	24.89	23.12	20.83	13.71
1929														
January	29.11	29.07	28.12	28.08	27.10	25.82	16.48	30.42	29.66	29.29	28.59	27.70	25.84	16.40
February	28.35	28.08	27.30	27.02	26.30	25.30	15.40	30.14	29.26	29.01	28.26	27.71	26.41	15.48
March	30.02	29.65	29.02	28.65	27.55	26.25	18.80	30.75	29.65	29.55	28.65	28.10	26.65	20.00
April	30.15	29.80	29.00	28.75	27.90	26.65	20.65	31.48	30.48	30.45	29.45	28.95	27.45	20.30
May	29.85	29.38	28.65	28.24	26.70	24.86	16.64	30.90	29.42	29.51	28.36	27.22	25.58	14.14
June	29.62	29.15	28.50	27.88	25.48	22.65	13.85	29.42	28.30	27.95	26.68	25.65	23.00	13.80
July	29.18	29.13	28.08	27.88	25.36	21.59	14.18	30.34	29.88	29.16	28.64	26.56	24.14	14.89
August	27.60	27.60	26.48	26.48	24.05	20.80	13.30	26.90	26.55	25.12	24.95	22.52	20.15	12.79
September	25.38	25.38	24.38	24.38	22.00	18.85	11.45	26.08	25.92	24.12	23.98	21.56	20.00	11.55
October	23.80	23.78	22.40	22.18	20.74	18.80	11.64	25.09	24.22	23.92	23.00	22.45	20.86	11.23
November	24.20	23.95	22.75	22.75	21.20	19.40	12.40	25.44	24.50	24.38	23.53	23.41	21.11	12.80
December	25.52	24.35	24.20	23.35	22.05	19.90	12.56	26.00	25.20	25.00	24.20	23.82	22.12	12.39
Average	27.73	27.44	26.57	26.30	24.70	22.57	14.78	28.58	27.75	27.29	26.52	25.47	23.61	14.65

Bureau of Agricultural Economics. Compiled from data of the livestock and meat-reporting service of the bureau. Earlier data in 1927 Yearbook, pp. 1050–1055 and in 1928 Yearbook, pp. 964–966.

TABLE 429.—*Hides, packer: Average price per pound at Chicago, 1920–1929*

Year	Steers					Cows			Bulls	
	Heavy native	Heavy Texas	Light Texas	Butt branded	Colorados	Heavy native	Light native	Branded	Native	Branded
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	31.65	27.52	26.38	27.25	26.02	31.08	29.23	24.93	24.97	22.28
1921	13.88	13.10	11.43	12.83	11.85	12.41	11.37	10.00	8.40	7.13
1922	17.83	16.57	15.29	16.51	15.59	16.10	15.16	13.47	11.96	10.15
1923	16.46	14.79	13.77	14.89	13.86	14.21	12.94	11.11	11.69	9.89
1924	14.67	13.82	12.80	13.80	12.79	12.95	12.29	10.41	10.14	8.79
1925	15.96	15.08	14.06	15.16	14.12	14.82	14.62	13.30	11.98	10.29
1926	14.08	13.38	12.67	13.34	12.82	12.71	13.11	12.05	9.98	8.50
1927	19.28	18.21	17.49	18.23	17.74	18.08	18.66	17.26	14.09	12.88
1928	23.85	22.91	22.26	22.95	22.26	22.96	22.63	21.79	17.64	16.62
1929	16.98	16.08	15.16	16.11	15.39	15.86	15.75	14.86	11.42	10.17
1929										
January	20.50	19.20	18.10	19.20	18.20	18.20	17.50	16.80	13.20	12.20
February	15.62	15.00	14.25	15.00	14.25	14.31	15.25	13.62	10.44	9.50
March	14.62	13.62	13.12	13.62	13.12	13.75	14.50	13.25	10.50	9.25
April	14.75	14.00	13.50	14.00	13.50	14.25	15.00	14.00	10.50	9.25
May	14.80	13.90	13.40	13.90	13.40	13.80	14.80	13.90	10.75	9.45
June	16.62	15.62	15.12	15.62	15.00	15.75	16.50	15.50	11.69	9.75
July	17.87	16.62	16.00	16.62	16.00	17.50	16.87	16.25	12.50	10.75
August	18.60	17.70	16.60	17.80	17.20	18.10	16.90	16.30	12.55	11.35
September	19.50	19.00	17.50	19.00	18.00	18.87	17.62	16.50	12.50	11.56
October	18.60	18.05	16.60	17.95	16.95	17.40	16.10	15.70	12.20	11.20
November	16.50	15.62	14.37	15.75	15.00	14.87	14.19	13.44	10.50	9.28
December	16.00	14.62	13.37	14.87	14.00	13.50	13.75	13.00	9.75	8.56

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade. Data 1893–1919 available in 1925 Yearbook, p. 1199, Table 610.

TABLE 430.—*Hides, country: Average price per pound at Chicago, 1920–1929*

Year	Extremes	Heavy steers	Heavy cows	No. 1 buffs	No. 2 buffs	Bulls	Country packer brands	Country brands	No. 1 calfskins	No. 1 kipskins
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	22.79	24.20	19.27	18.93	17.93	18.76	20.60	14.94	40.98	33.97
1921	8.95	9.35	7.32	7.10	5.77	5.43	7.43	5.33	18.57	15.58
1922	12.93	12.03	10.85	10.86	9.52	8.23	12.53	8.42	18.95	17.29
1923	11.65	11.39	10.43	10.45	9.26	8.93	10.12	8.70	17.18	15.42
1924	11.86	11.31	9.24	9.63	8.63	7.86	9.81	8.23	20.39	16.62
1925	14.41	12.94	11.64	12.26	11.25	9.46	12.52	10.54	21.88	18.12
1926	13.46	11.63	9.54	10.70	9.70	8.03	10.52	9.00	18.02	16.12
1927	18.60	16.02	14.85	16.26	15.26	11.49	15.54	13.89	20.47	19.96
1928	22.04	18.53	18.05	19.71	18.71	14.88	19.18	17.38	27.84	25.23
1929	14.98	12.09	11.55	12.82	11.82	8.92	11.88	10.80	20.72	18.72
1929										
January	16.55	14.50	14.00	14.45	13.45	10.50	14.05	12.40	23.50	20.75
February	14.06	11.87	11.12	12.06	11.06	8.87	11.62	10.25	19.12	16.81
March	15.00	12.25	11.87	12.87	11.87	8.81	12.00	10.87	20.87	18.00
April	15.00	12.00	11.50	12.75	11.75	9.00	11.75	10.75	21.12	18.94
May	14.30	11.40	10.70	12.15	11.15	8.45	11.10	10.20	19.80	17.75
June	15.56	12.25	11.62	13.37	12.37	9.62	12.12	11.25	20.94	18.94
July	15.62	12.25	11.75	13.12	12.12	9.37	12.50	11.50	21.62	19.81
August	15.55	12.30	11.80	12.85	11.85	9.30	12.40	11.30	21.50	19.50
September	16.37	12.50	12.00	13.81	12.81	9.56	12.50	11.50	21.50	20.12
October	15.15	12.00	11.50	13.10	12.10	8.75	11.70	10.70	21.00	19.90
November	13.25	11.00	10.50	11.75	10.75	7.75	10.62	9.62	19.00	17.37
December	13.37	10.75	10.25	11.56	10.56	7.06	10.25	9.25	18.62	16.87

Bureau of Agricultural Economics. Compiled from annual reports of the Chicago Board of Trade. Data 1893–1919 available in 1925 Yearbook, p. 1199, Table 611.

TABLE 431.—*Horses and mules: Number and value on farms, United States, January 1, 1910–1929*

Jan. 1—	Horses			Mules		
	Number	Value per head	Farm value	Number	Value per head	Farm value
	Thousands	*Dollars*	*1,000 dollars*	*Thousands*	*Dollars*	*1,000 dollars*
1910 (Apr. 15)	*19,833*	108.03	2,142,524	4,210	120.20	506,049
1911	20,277	111.46	2,259,981	4,323	125.92	544,359
1912	20,509	105.94	2,172,694	4,362	120.51	525,657
1913	20,567	110.77	2,278,222	4,386	124.31	545,245
1914	20,962	109.32	2,291,638	4,449	123.85	551,017
1915	21,195	103.33	2,190,102	4,479	112.36	503,271
1916	21,159	101.60	2,149,786	4,593	113.83	522,834
1917	21,210	102.89	2,182,307	4,723	118.15	558,006
1918	21,555	104.24	2,246,970	4,873	128.81	627,679
1919	21,482	98.45	2,114,897	4,954	135.83	672,922
1920	19,848	96.52	1,915,653	5,475	148.46	812,828
1921	19,134	84.57	1,618,120	5,586	117.52	656,455
1922	18,564	71.18	1,321,396	5,638	89.14	502,563
1923	17,943	70.65	1,267,624	5,702	87.17	497,044
1924	17,222	65.48	1,127,619	5,730	85.90	492,209
1925	16,470	64.29	1,058,912	5,725	82.73	473,646
1926	15,830	65.50	1,036,843	5,740	81.49	467,760
1927	15,133	64.14	970,703	5,652	74.57	421,467
1928	14,540	67.05	974,855	5,532	79.71	440,958
1929 [1]	14,029	69.95	981,331	5,447	82.20	447,727

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Figures in italics are census returns. Figures for earlier years are shown in 1923 Yearbook. Later, revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Preliminary.

TABLE 432.—*Horses and horse colts: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	84	80	78	74	72	119.00	129.00	130.00	135.00	140.00
New Hampshire	32	30	28	26	24	105.00	100.00	105.00	120.00	121.00
Vermont	64	61	57	54	53	104.00	110.00	110.00	119.00	124.00
Massachusetts	45	41	39	37	35	124.00	119.00	119.00	135.00	130.00
Rhode Island	6	6	5	5	4	124.00	120.00	120.00	135.00	130.00
Connecticut	35	33	32	29	27	127.00	120.00	128.00	140.00	145.00
New York	440	418	401	389	382	108.00	111.00	109.00	116.00	124.00
New Jersey	57	54	54	52	50	109.00	107.00	109.00	109.00	114.00
Pennsylvania	410	390	374	359	349	96.00	103.00	99.00	112.00	116.00
North Atlantic	1,173	1,113	1,068	1,025	996	105.63	109.51	108.06	117.32	122.49
Ohio	630	598	568	542	520	85.00	91.00	95.00	101.00	105.00
Indiana	556	548	540	522	517	69.00	78.00	80.00	82.00	82.00
Illinois	1,030	978	929	874	839	69.00	74.00	74.00	74.00	77.00
Michigan	482	463	444	426	409	84.00	89.00	89.00	98.00	110.00
Wisconsin	604	591	579	567	544	88.00	93.00	95.00	98.00	102.00
Minnesota	835	827	819	803	787	77.00	81.00	77.00	79.00	82.00
Iowa	1,180	1,145	1,111	1,089	1,046	72.00	74.00	74.00	75.00	78.00
Missouri	708	670	636	604	574	48.00	49.00	48.00	50.00	53.00
North Dakota	731	708	673	633	589	56.00	56.00	53.00	53.00	52.00
South Dakota	720	684	643	611	593	48.00	49.00	47.00	53.00	57.00
Nebraska	862	840	815	788	764	58.00	61.00	56.00	59.00	60.00
Kansas	931	894	840	798	766	46.00	48.00	41.00	43.00	49.00
North Central	9,269	8,946	8,597	8,257	7,948	65.55	68.93	67.84	70.52	73.85
Delaware	23	22	21	20	19	74.00	79.00	69.00	79.00	88.00
Maryland	117	112	104	100	97	74.00	77.00	78.00	89.00	92.00
Virginia	261	238	224	206	198	71.00	66.00	66.00	70.00	78.00
West Virginia	147	140	133	128	124	76.00	75.00	74.00	84.00	89.00
North Carolina	130	120	112	105	98	99.00	86.00	83.00	87.00	86.00
South Carolina	55	49	45	42	40	97.00	89.00	76.00	81.00	82.00
Georgia	56	51	46	41	39	86.00	83.00	74.00	78.00	78.00
Florida	29	28	27	26	25	98.00	97.00	82.00	83.00	87.00
South Atlantic	818	760	712	668	640	80.60	76.66	73.51	80.27	84.46
Kentucky	314	305	293	284	278	50.00	50.00	47.00	53.00	56.00
Tennessee	243	231	219	210	202	61.00	53.00	54.00	60.00	60.00
Alabama	90	86	82	73	65	70.00	68.00	63.00	66.00	66.00
Mississippi	135	125	118	106	100	63.00	60.00	56.00	61.00	58.00
Arkansas	188	169	157	146	136	42.00	42.00	40.00	43.00	41.00
Louisiana	132	126	113	107	102	62.00	55.00	49.00	52.00	53.00
Oklahoma	614	589	565	537	516	41.00	37.00	35.00	38.00	39.00
Texas	857	848	788	780	780	54.00	48.00	44.00	45.00	46.00
South Central	2,573	2,479	2,335	2,243	2,179	51.54	47.57	44.41	47.42	48.20
Montana	596	576	547	531	515	32.00	29.00	30.00	31.00	31.00
Idaho	233	226	221	214	210	45.00	52.00	52.00	51.00	54.00
Wyoming	200	198	194	190	186	29.00	29.00	31.00	31.00	32.00
Colorado	367	352	331	324	308	43.00	47.00	44.00	43.00	47.00
New Mexico	188	175	170	168	163	38.00	37.00	33.00	31.00	36.00
Arizona	112	106	101	98	90	59.00	50.00	50.00	49.00	51.00
Utah	110	106	104	102	100	61.00	61.00	61.00	61.00	63.00
Nevada	50	47	44	42	41	56.00	53.00	53.00	59.00	58.00
Washington	242	230	218	209	205	63.00	62.00	62.00	65.00	67.00
Oregon	225	214	201	191	181	67.00	65.00	62.00	65.00	65.00
California	314	302	290	278	267	78.00	76.00	76.00	74.00	78.00
Far Western	2,637	2,532	2,421	2,347	2,266	48.90	48.24	47.94	47.86	49.99
United States	16,470	15,830	15,133	14,540	14,029	64.29	65.50	64.14	67.05	69.95

Bureau of Agricultural Economics. Estimates of the crop-reporting board. Later, revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Sum of total value of subgroups (classified by age), divided by total number and rounded to nearest dollar for States. Division and United States averages not rounded.
[2] Preliminary.

TABLE 433.—*Mules and mule colts: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
New York	7	7	7	7	6	115.00	112.00	120.00	125.00	120.00
New Jersey	5	5	5	5	5	125.00	114.00	118.00	118.00	123.00
Pennsylvania	53	53	52	51	51	105.00	113.00	110.00	121.00	127.00
North Atlantic	65	65	64	63	62	107.74	113.08	111.77	120.98	125.71
Ohio	33	32	33	33	32	93.00	96.00	94.00	103.00	101.00
Indiana	101	99	101	101	101	76.00	86.00	86.00	86.00	87.00
Illinois	168	165	160	150	144	80.00	85.00	85.00	82.00	86.00
Michigan	7	7	8	8	7	83.00	86.00	86.00	93.00	102.00
Wisconsin	7	7	7	7	7	85.00	87.00	86.00	95.00	95.00
Minnesota	13	13	14	14	14	80.00	79.00	81.00	83.00	83.00
Iowa	97	98	100	98	93	83.00	85.00	83.00	84.00	86.00
Missouri	372	365	347	330	313	67.00	71.00	66.00	68.00	75.00
North Dakota	9	9	10	10	10	62.00	59.00	55.00	57.00	55.00
South Dakota	21	22	22	22	22	61.00	64.00	57.00	63.00	65.00
Nebraska	120	120	118	110	106	74.00	78.00	69.00	74.00	76.00
Kansas	260	252	237	213	198	63.00	66.00	57.00	60.00	65.00
North Central	1,208	1,189	1,157	1,096	1,047	71.50	75.75	71.37	73.52	77.52
Delaware	9	9	9	9	9	90.00	100.00	91.00	95.00	96.00
Maryland	31	31	30	29	28	94.00	104.00	101.00	113.00	111.00
Virginia	104	104	103	105	105	91.00	87.00	86.00	92.00	97.00
West Virginia	15	15	14	14	14	86.00	85.00	78.00	81.00	86.00
North Carolina	279	276	279	279	276	119.00	117.00	107.00	119.00	124.00
South Carolina	199	193	185	179	177	122.00	120.00	95.00	105.00	105.00
Georgia	338	347	347	347	347	115.00	112.00	95.00	105.00	109.00
Florida	43	43	43	43	42	139.00	134.00	117.00	119.00	124.00
South Atlantic	1,018	1,018	1,010	1,005	998	114.63	112.46	98.28	107.95	111.42
Kentucky	301	304	301	295	292	63.00	63.00	58.00	67.00	69.00
Tennessee	352	356	352	341	321	74.00	72.00	69.00	75.00	80.00
Alabama	309	312	315	321	327	90.00	95.00	84.00	95.00	95.00
Mississippi	330	336	343	336	336	89.00	86.00	79.00	87.00	85.00
Arkansas	339	346	329	332	339	64.00	63.00	59.00	64.00	65.00
Louisiana	174	176	169	167	167	90.00	90.00	79.00	85.00	89.00
Oklahoma	369	369	365	347	333	61.00	57.00	51.00	52.00	58.00
Texas	1,042	1,052	1,031	1,021	1,021	83.00	75.00	69.00	71.00	71.00
South Central	3,216	3,251	3,205	3,160	3,136	77.19	74.05	68.06	72.94	74.49
Montana	11	11	11	11	11	47.00	50.00	45.00	47.00	47.00
Idaho	8	8	8	7	7	52.00	61.00	60.00	55.00	60.00
Wyoming	6	6	6	5	5	49.00	49.00	49.00	52.00	55.00
Colorado	39	38	36	33	32	57.00	59.00	55.00	56.00	58.00
New Mexico	33	34	34	31	30	58.00	54.00	45.00	45.00	50.00
Arizona	12	12	12	12	12	85.00	87.00	77.00	77.00	82.00
Utah	4	4	4	4	4	62.00	64.00	62.00	61.00	67.00
Nevada	4	4	4	4	4	62.00	64.00	60.00	61.00	62.00
Washington	27	27	28	29	29	68.00	67.00	72.00	73.00	74.00
Oregon	18	19	20	20	19	72.00	73.00	70.00	72.00	71.00
California	56	54	53	52	51	95.00	92.00	89.00	85.00	87.00
Far Western	218	217	216	208	204	70.29	69.67	66.36	66.34	68.43
United States	5,725	5,740	5,652	5,532	5,447	82.73	81.49	74.57	79.71	82.20

Bureau of Agricultural Economics. Estimates of crop-reporting board. Later, revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Sum of total value of subgroups (classified by age) divided by total number and rounded to nearest dollar for States. Division and United States averages not rounded.
[2] Preliminary.

TABLE 434.—*Horses and mules: Farm value per head, by age groups, United States, January 1, 1910–1930*

Jan. 1—	Horses			Mules		
	Under 1 year old	1 and under 2 years	2 years and over	Under 1 year old	1 and under 2 years	2 years and over
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
1910	46.05	72.63	116.57	56.76	84.53	128.96
1911	48.09	75.68	120.04	59.89	88.13	135.11
1912	45.75	71.96	114.24	56.12	83.00	129.46
1913	48.75	76.54	121.06	59.31	86.56	134.05
1914	47.95	74.87	119.77	57.45	83.87	133.76
1915	45.36	70.62	113.10	51.80	76.46	121.46
1916	44.30	69.08	111.34	51.59	76.82	123.55
1917	45.17	70.21	112.64	53.98	80.28	128.17
1918	45.20	70.21	114.30	57.61	86.32	139.88
1919	42.62	65.94	108.17	59.14	89.14	147.65
1920	37.22	58.81	103.52	60.16	90.14	160.55
1921	31.59	49.66	90.35	47.55	71.77	125.85
1922	26.50	41.07	75.61	35.55	52.82	94.81
1923	26.51	40.48	74.53	34.35	50.94	92.14
1924	24.68	37.36	68.64	31.83	47.06	90.42
1925	23.80	37.09	66.83	30.65	46.63	86.20
1926	24.82	37.75	68.18	31.30	47.88	84.76
1927	23.75	37.37	66.75	29.41	43.91	77.36
1928	24.96	39.21	69.81	31.19	46.55	82.56
1929	26.34	41.11	72.84	32.72	48.63	84.89

Bureau of Agricultural Economics. Based on returns from special price reporters. Average value, by States, weighted by estimated numbers each age group.

TABLE 435.—*Horses: Price per head received by producers, United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Weighted average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	140	147	150	154	148	151	148	148	145	144	143	141	146
1911	143	144	145	147	146	145	139	141	139	137	136	134	141
1912	134	137	140	142	144	145	142	142	141	140	139	139	140
1913	140	146	146	148	145	146	143	141	141	138	136	135	142
1914	137	139	138	138	139	136	137	135	132	131	130	130	135
1915	130	132	132	132	133	132	134	131	131	129	127	126	130
1916	128	129	131	133	134	132	133	131	131	130	129	129	130
1917	129	131	133	136	138	137	135	132	132	130	129	129	132
1918	130	133	137	137	136	135	132	131	128	126	122	121	130
1919	120	121	124	127	129	127	127	125	119	114	113	113	121
1920	118	123	127	131	132	130	127	124	119	112	103	97	119
1921	96	98	101	100	98	98	94	93	89	85	82	81	92
1922	82	84	86	87	89	88	88	86	84	81	79	79	84
1923	81	85	85	86	88	87	85	83	82	80	78	75	82
1924	73	74	75	76	78	77	77	79	78	77	76	73	76
1925	73	78	81	83	82	81	81	80	77	76	75	74	78
1926	75	80	82	84	84	83	82	80	78	77	75	73	79
1927	73	77	79	80	81	80	80	80	78	76	75	75	77
1928	77	82	85	85	86	86	85	84	82	80	79	78	82
1929	77	79	83	85	85	84	84	82	82	79	78	77	81

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of horses Jan. 1, by States; yearly prices obtained by weighing monthly prices by receipts at public stock yards.

HONEY AND BEESWAX

TABLE 436.—*Honey: Monthly average prices in producing sections and at consuming markets, 1920–1929*

EXTRACTED HONEY, PER POUND

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
CALIFORNIA WHITE ORANGE												
F. o. b. Southern California shipping points: [1]	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	18¼	18¼	17¾	17¼	21	19¾	19½	19¼	18½	18¼	17¾	16¾
1921	16¼	13¾	13	12	11¼	11¼	9¼	10½	11	11¾	12¼	11½
1922	11½	11½	11	------	8½	9	9½	9½	9½	10¼	10¾	10¾
1923	10¾	10½	10¼	10¼	11¾	------	12	------	------	------	------	13¼
1924	13	------	14	14½	11¾	13¼	12	12½	13	13¼	14½	14¼
1925	14¼	------	15	------	13½	13	11¾	11¾	------	14½	15½	------
1926	12¼	11¾	11½	10½	9½	8¾	8¾	------	------	8½	------	------
1927	------	7¾	9	8¾	8	8¼	8¾	9	9¼	9½	9½	10
1928	10	10	10	9½	8¾	8¾	9	9¼	9¼	9½	9¾	9¾
1929	9¾	9¾	9½	9½	10	10¼	11	11¼	11	11	12	------
New York City: [3]												
1920	20¾	18¾	17½	19¼	20	21¾	18	17¼	18¾	17	17	16¼
1921	17½	14¾	12¼	11	11½	12	11½	11	12¼	12½	12¾	12¾
1922	13½	13	13¼	12½	13	12	11¾	11¾	11¾	12	12½	12¾
1923	12¾	12¾	12¾	12¾	13	13½	13¾	13¾	14½	14	15	16
1924	15½	16	15	15½	15½	13½	14½	14	------	13¾	13½	------
1925	------	------	------	------	------	14¼	------	14½	14¼	13½	14	14½
1926	15¼	15	14½	------	------	------	11¼	11	11½	11¾	11¾	12½
1927	12½	12½	11	------	11	11¼	11½	12¾	13	12¾	13	13
1928	------	------	------	------	12½	12½	12½	12½	12¾	13	12¾	12½
1929	12½	12½	12½	12½	12½	12½	12½	12¾	13	13½	13½	13½
INTERMOUNTAIN WHITE SWEET CLOVER AND ALFALFA												
F. o. b. Intermountain points: [3]												
1921	------	------	------	8¼	7¾	7½	7¼	7¾	7¾	7¾	8	8½
1922	8½	8½	8½	8½	8½	8¾	9¼	------	8	8	8	8
1923	7¾	8	7¼	7½	7½	7¾	8½	8¾	8	9	9	9
1924	9	9¼	9¼	9¼	9¼	9	8¾	9	9	9	9	9¼
1925	9½	9¼	9¼	9¼	9	------	8½	8½	8½	8½	8½	8½
1926	8	8¼	8	7¾	7½	7½	7½	7	6¾	6¾	6¾	6¾
1927	6¾	6½	6	5¾	5¾	6	6	6¾	7	7½	7¾	7¼
1928	7¼	7½	7¼	7¼	7¼	7	7¼	7	7¼	7¼	7	7
1929	7⅛	7⅛	7⅜	7⅝	7¾	7½	7	7⅜	7¼	7⅛	7¼	7⅛
WHITE CLOVER												
F. o. b. New York and North Central States: [4]												
1921	------	------	------	------	------	------	------	------	9¾	9¾	9¾	10¾
1922	10½	10	10¾	10¾	10½	11¼	11½	11	11	11	10¾	11
1923	11	10¾	10	10	10½	11	11	11¾	11¼	10¾	10¾	10¾
1924	10¾	10¾	10¾	11	11	10¾	10½	11	10¾	10¾	11¼	11
1925	11¼	11¼	11¼	11¼	11½	11½	11½	10¾	11	11	10¾	10½
1926	9¾	10	9¼	9¾	9	9½	10¼	10	9½	9½	10	9½
1927	10¼	10	9½	9½	9¼	8¾	8½	9	8½	8½	8¾	8½
1928	8½	8¼	8	8	8	8½	9¼	9	8¾	8½	9	8½
1929	8¾	8¾	9	9¼	8¾	9	9½	8¾	8½	8¼	8¼	8
NORTHEASTERN BUCKWHEAT												
F. o. b. New York and Pennsylvania points: [4]												
1921	------	------	------	------	------	------	------	------	9	8¼	7½	8
1922	7	8	7½	7½	------	8	8½	6½	7¾	8	8	8
1923	7¾	8	8½	------	------	8	------	9	9	9¼	9	9
1924	9	9	8½	8¾	8½	8½	8¼	------	9	9¼	9	9
1925	8¾	9	10	9	------	------	------	9¼	9	8½	8½	8¾
1926	8	7¾	7½	7	6½	6½	6	6½	7	7	7	8
1927	8¼	7	7¼	------	8½	------	------	8	7½	7¼	7¼	7½
1928	7¼	7¼	7¼	6¾	------	------	------	8	7¾	7½	7½	7¼
1929	7¾	7½	7	7¼	7½	7½	------	8½	7⅞	8	7⅝	7¼

See footnotes at end of table.

TABLE 436.—*Honey: Monthly average prices in producing sections and at consuming markets, 1920–1929*—Continued

COMB HONEY, 24-SECTION CASES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
WHITE CLOVER COMB, NO. 1 AND FANCY												
F. o. b. New York and North Central States: [4]	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1921	------	------	------	------	------	------	------	------	5.10	5.00	5.10	4.65
1922	5.00	5.10	5.00	4.50	------	------	4.45	5.00	4.55	4.90	4.70	4.70
1923	4.75	4.75	------	------	4.00	------	5.00	5.00	5.25	5.10	4.75	5.15
1924	4.75	4.75	5.05	4.80	5.50	------	4.80	4.85	4.95	4.80	5.10	4.95
1925	4.95	4.95	4.75	4.90	5.25	4.50	5.10	5.20	5.00	5.00	4.65	4.45
1926	4.25	4.25	4.25	4.00	4.00	4.00	4.25	4.75	4.50	4.25	4.25	4.25
1927	4.50	5.25	5.25	5.25	------	5.00	5.00	4.75	4.25	4.75	4.50	4.80
1928	4.80	4.80	4.50	4.80	4.50	4.25	4.50	4.50	4.50	4.50	4.80	4.50
1929	4.80	4.50	4.25	4.25	4.50	4.25	4.50	4.50	4.25	4.00	4.00	4.00

Bureau of Agricultural Economics.

[1] Price to beekeepers or other shippers in car lots to July, 1923; thereafter, price in large lots, mostly less than car lots.
[2] Sales by original receivers to bottlers, confectioners, bakers, and jobbers.
[3] Price to beekeepers and other shippers, in car lots.
[4] Price to beekeepers in large lots, mostly less than car lots.

TABLE 437.—*Beeswax: Monthly average price per pound of domestic beeswax at Chicago, 1920–1928*

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Chicago: [1]												
Light—	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	44	41½	42¾	43¾	45¾	44	43¼	41	40	40¼	37	34¾
1921	31½	31¼	30½	31	32¼	31½	31¾	29	29	30¼	30¼	31
1922	31	31	29¾	28¾	33	31¼	31½	30¾	31	31½	31½	30½
1923	30¾	31½	32	32½	32	32	31	29	30	30	29	29½
1924	29¼	28½	29	31¼	28¾	27½	27	27	29	32½	32¼	33¼
1925	35	35	38	41¾	38	35	33½	33½	34	37¾	38	38
1926	------	40	------	------	------	------	39½	38½	38½	39½	39	39
1927	39	39	40	40	40	40½	41	41	41	43	41½	41½
1928	41½	41	40½	40½	41½	41½	------	41	41	41	41½	42½
1929	42½	41½	41½	41½	38¾	37	37¼	36¾	41½	37	------	------
Dark—												
1920	38½	36¼	39	40¾	42	40½	39½	37	35½	36½	34½	32¼
1921	29¼	28½	27¾	25¾	25¼	27¾	26¼	25¾	26½	27	27¼	27½
1922	28½	28	24½	25½	29	28	29	28	27¼	28	27¾	27¾
1923	28	28½	28½	28¾	29	29¼	28½	25½	25¼	26	26	24
1924	26	26¼	26	27	25¼	25½	25½	24½	26	29	28	27½
1925	31	31	33¾	36¾	34	29½	29½	29¾	29½	34½	34	34
1926	------	------	------	------	------	------	33	33	------	------	------	------
1927	------	------	34½	34½	34½	35	35	35	35	37	38	38
1928	38	38	38	------	------	37	------	36½	------	------	------	------
1929	------	39½	40	38½	37¾	36	36	35	35	35	34½	34½

Bureau of Agricultural Economics.

[1] Sales by original receivers to wholesalers, polish and laundry-supply manufacturers, etc.

DAIRY AND POULTRY

TABLE 438.—*Milk cows and dairy cattle: Numbers and value per head in the United States, 1850, 1860, 1867–1929*

Year	Milk cows on farms: Number [1]	Milk cows on farms: Value per head, Jan. 1 [2]	Dairy cattle on farms and elsewhere, Jan. 1 [3]	Year	Milk cows on farms: Number [1]	Milk cows on farms: Value per head, Jan. 1 [2]	Dairy cattle on farms and elsewhere, Jan. 1 [3]
	Thousands	*Dollars*	*Thousands*		*Thousands*	*Dollars*	*Thousands*
1850 [4]	*6,385*		10,100	1898	15,841	27.45	26,400
1860 [4]	*8,586*		13,500	1899	15,990	29.66	26,800
1867	8,349	28.74	12,000	1900 [4]	*17,136*		
1868	8,692	26.56	12,400	1900	16,292	30.18	24,965
1869	9,248	29.15	13,000	1901	16,834	28.65	25,863
1870 [4]	*8,935*			1902	16,697	27.91	26,711
1870	10,096	32.70	14,000	1903	17,111	28.85	27,864
1871	10,023	33.89	14,100	1904	17,420	27.90	28,915
1872	10,304	29.45	14,700	1905	17,572	26.21	28,975
1873	10,576	26.72	15,400	1906	19,794	28.12	29,437
1874	10,705	25.63	15,800	1907	20,968	29.60	28,490
1875	10,907	25.74	16,300	1908	21,194	29.29	28,505
1876	11,085	25.61	16,900	1909	21,720	30.90	28,763
1877	11,261	25.47	17,400	1910 [4]	*20,625*		
1878	11,300	25.74	17,700	1910	20,625	33.70	28,945
1879	11,826	21.71	18,900	1911	20,823	38.17	28,877
1880 [4]	*12,443*			1912	20,699	37.62	29,183
1880	12,027	23.27	19,500	1913	20,497	42.99	29,836
1881	12,369	23.95	20,100	1914	20,737	51.51	31,601
1882	12,612	25.89	20,500	1915	21,262	52.84	33,381
1883	13,126	30.21	21,300	1916	22,108	51.49	34,392
1884	13,501	31.37	21,900	1917	22,894	56.95	35,727
1885	13,905	29.70	22,600	1918	23,310	67.37	35,467
1886	14,235	27.40	23,100	1919	23,475	74.68	34,481
1887	14,522	26.08	23,600	1920 [4]	*19,675*		
1888	14,856	24.65	24,100	1920	[5] 21,427	81.51	33,990
1889	15,299	23.94	24,900	1921	21,408	61.19	33,618
1890 [4]	*16,512*			1922	21,788	48.68	33,944
1890	15,953	22.14	25,900	1923	22,063	48.67	34,469
1891	16,020	21.62	26,100	1924	22,255	49.94	34,708
1892	16,416	21.40	26,900	1925 [4]	*20,900*		
1893	16,424	21.75	27,000	1925	22,481	48.39	35,188
1894	16,487	21.77	27,100	1926	22,188	55.02	34,329
1895	16,505	21.97	27,300	1927	21,801	59.58	33,992
1896	16,138	22.55	26,800	1928	21,824	73.93	33,475
1897	15,942	23.16	26,500	1929	[6] 21,820	84.59	33,653

Bureau of Agricultural Economics. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February 1930, Crops and Markets.

[1] Prior to 1920 estimates for each 10-year period represent an index of annual changes applied to the census as a base on first report after census data were available. Figures for 1920 to date are revised estimates of the Bureau of Agricultural Economics for numbers on Jan. 1.

[2] Values for 1867–1899 relate to "milk cows." Data for 1900–1925 are an old series of values of "milk cows" adjusted to relate to "milk cows and heifers, 2 years old and over" on basis of relationship between the 2 series from 1926 to 1928. Conversion factor was 0.955 (base is old series). Data for 1926–1929 are values relating to "milk cows and heifers 2 years old and over."

[3] Data for dairy cattle, including young animals and bulls of that type on farms and elsewhere as of Jan. 1, estimated by the Bureau of Animal Industry. Census figures for milk and dairy cows were adjusted to a Jan. 1 basis and to include all ages and all animals in towns, villages, and ranges, as well as on farms. For methods see Department Circular 241. Revisions have been made by the Bureau of Animal Industry for 1900–1929.

[4] Italic figures are from the census. Figures for census years 1850–1890 represent "milk cows"; 1900, "cows kept for milk 2 years and over"; 1910, "cows and heifers kept for milk, born before Jan. 1, 1909" (15½ months and over); 1920, "dairy cattle 2 years old and over kept mainly for milk production." For comparison with 1920 the number of dairy cows and heifers 2 years old and over on Jan. 1, 1910, has been estimated by the census as 17,125,471; 1925, number of cows milked. Census dates were June 1 from 1850 to 1900; Apr. 15, 1910; Jan. 1, 1920 and 1925.

[5] Beginning with 1920, heifers 1 to 2 years old being kept for milk cows were estimated as follows: 1920–1929, respectively, 4,418,000, 4,155,000, 3,968,000, 4,147,000, 4,137,000, 4,195,000, 3,923,000, 4,059,000, 4,201,000, 4,377,000.

[6] Preliminary.

TABLE 439.—*Milk cows and heifers: Estimated number on farms and value per head, by States, January 1, 1925–1929*

State and division	Cows and heifers 2 years old and over kept for milk									
	Number					Value per head [1]				
	1925	1926	1927	1928	1929 [2]	1925	1926	1927	1928	1929 [2]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Maine	156	150	146	139	139	50.00	64.00	66.00	76.00	87.00
New Hampshire	85	80	77	75	75	56.00	72.00	80.00	100.00	113.00
Vermont	287	288	286	286	286	54.00	66.00	75.00	97.00	100.00
Massachusetts	148	140	136	135	134	74.00	86.00	98.00	125.00	130.00
Rhode Island	22	22	21	20	21	80.00	86.00	105.00	132.00	142.00
Connecticut	118	116	110	108	109	75.00	87.00	97.00	130.00	140.00
New York	1,383	1,362	1,318	1,330	1,330	61.00	79.00	90.00	111.00	124.00
New Jersey	123	123	119	122	122	72.00	92.00	103.00	120.00	135.00
Pennsylvania	889	862	845	855	855	58.00	71.00	75.00	97.00	111.00
North Atlantic	3,211	3,143	3,058	3,070	3,071	60.54	75.89	84.27	105.72	117.59
Ohio	964	945	926	917	908	54.00	62.00	67.00	83.00	93.00
Indiana	679	672	679	679	693	55.00	58.00	63.00	75.00	85.00
Illinois	1,049	1,039	988	968	949	57.00	63.00	67.00	76.00	89.00
Michigan	850	858	841	841	841	58.00	64.00	70.00	87.00	99.00
Wisconsin	2,015	2,055	2,014	1,984	1,935	53.00	65.00	70.00	86.00	97.00
Minnesota	1,560	1,560	1,513	1,498	1,483	49.00	57.00	57.00	72.00	85.00
Iowa	1,341	1,341	1,314	1,314	1,314	56.00	61.00	64.00	76.00	86.00
Missouri	835	827	827	827	810	42.00	44.00	48.00	61.00	74.00
North Dakota	520	530	472	463	454	42.00	45.00	48.00	61.00	75.00
South Dakota	544	539	513	518	523	45.00	49.00	52.00	68.00	77.00
Nebraska	625	625	613	613	613	50.00	54.00	55.00	71.00	84.00
Kansas	760	730	715	701	701	46.00	50.00	51.00	62.00	75.00
North Central	11,742	11,721	11,415	11,323	11,224	51.48	57.94	61.36	75.33	86.97
Delaware	34	35	35	36	37	57.00	61.00	70.00	92.00	110.00
Maryland	184	182	178	185	187	57.00	65.00	65.00	85.00	97.00
Virginia	393	380	357	364	382	39.00	40.00	44.00	58.00	70.00
West Virginia	225	221	207	215	219	38.00	41.00	45.00	65.00	75.00
North Carolina	312	303	297	294	294	37.00	39.00	45.00	59.00	64.00
South Carolina	176	155	150	144	145	34.00	33.00	39.00	47.00	55.00
Georgia	354	340	343	343	343	27.00	29.00	32.00	42.00	49.00
Florida	70	74	78	78	74	46.00	42.00	38.00	37.00	46.00
South Atlantic	1,748	1,690	1,645	1,659	1,681	38.11	40.31	43.89	57.58	66.85
Kentucky	473	464	469	493	493	35.00	38.00	45.00	60.00	65.00
Tennessee	462	434	425	438	447	29.00	32.00	38.00	53.00	60.00
Alabama	365	340	350	350	354	24.00	26.00	30.00	40.00	46.00
Mississippi	411	379	379	390	390	22.00	27.00	28.00	40.00	45.00
Arkansas	382	374	375	375	382	23.00	25.00	30.00	42.00	48.00
Louisiana	206	200	210	204	208	34.00	31.00	33.00	36.00	49.00
Oklahoma	582	570	581	610	610	32.00	37.00	45.00	56.00	64.00
Texas	985	936	936	936	955	30.00	30.00	41.00	57.00	61.00
South Central	3,866	3,697	3,725	3,796	3,839	28.90	31.19	37.87	50.84	56.92
Montana	187	190	181	177	177	46.00	50.00	51.00	63.00	79.00
Idaho	160	165	168	170	172	49.00	60.00	67.00	75.00	86.00
Wyoming	66	69	70	72	72	47.00	54.00	57.00	70.00	86.00
Colorado	224	224	240	242	244	44.00	49.00	56.00	69.00	77.00
New Mexico	64	64	64	65	65	42.00	42.00	45.00	57.00	67.00
Arizona	37	32	35	35	36	68.00	70.00	75.00	85.00	95.00
Utah	87	88	89	92	97	53.00	63.00	59.00	73.00	87.00
Nevada	19	20	20	20	20	58.00	72.00	75.00	85.00	98.00
Washington	283	275	275	275	280	62.00	63.00	70.00	80.00	99.00
Oregon	225	214	214	214	216	58.00	60.00	61.00	72.00	88.00
California	579	596	602	614	626	70.00	73.00	75.00	80.00	94.00
Far Western	1,931	1,937	1,958	1,976	2,005	57.71	61.79	65.18	74.53	88.53
United States	22,498	22,188	21,801	21,824	21,820	48.39	55.02	59.58	73.93	84.59

Bureau of Agricultural Economics. Estimates of crop reporting board. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Total value divided by total number and rounded to nearest dollar for States. Division and United States averages not rounded. State figures are new weighted value series not comparable to State figures previously published.

[2] Preliminary.

TABLE 440.—*Heifers and heifer calves: Estimated number on farms, by States, January 1, 1925–1929*

State and division	Heifers 1 to 2 years old being kept for milk cows					Heifer calves under 1 year being kept for milk cows				
	1925	1926	1927	1928	1929 [1]	1925	1926	1927	1928	1929 [1]
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*
Maine	31	31	33	32	34	32	32	34	33	35
New Hampshire	16	15	14	14	15	15	15	14	15	17
Vermont	46	45	47	49	55	50	48	49	55	59
Massachusetts	19	18	17	17	18	18	19	17	18	20
Rhode Island	2	2	2	3	3	2	2	3	3	3
Connecticut	17	14	13	13	13	17	14	13	13	14
New York	182	168	178	197	222	173	183	207	232	237
New Jersey	12	12	15	16	17	11	11	15	15	16
Pennsylvania	129	115	124	136	149	117	130	138	152	175
North Atlantic	454	420	443	477	526	435	454	490	536	576
Ohio	152	140	160	165	188	170	156	170	193	212
Indiana	111	105	112	125	135	114	130	137	150	159
Illinois	189	167	184	175	180	215	195	200	207	213
Michigan	146	149	153	159	165	190	175	180	182	184
Wisconsin	364	331	345	360	364	410	396	405	399	387
Minnesota	306	300	312	324	337	377	365	340	354	376
Iowa	273	245	245	250	250	250	250	240	240	240
Missouri	172	169	177	172	169	170	180	180	180	180
North Dakota	127	122	98	97	105	139	135	100	98	100
South Dakota	127	117	112	112	123	140	133	140	130	130
Nebraska	124	131	124	124	126	136	127	120	120	120
Kansas	148	133	120	125	131	140	140	125	130	137
North Central	2, 239	2, 109	2, 142	2, 188	2, 273	2, 451	2, 382	2, 337	2, 383	2, 438
Delaware	5	5	5	5	5	3	4	4	4	4
Maryland	25	24	25	26	27	23	24	25	27	29
Virginia	55	48	48	51	56	55	51	52	55	61
West Virginia	29	26	27	30	35	29	25	28	36	39
North Carolina	56	49	47	50	52	52	60	52	55	57
South Carolina	37	30	29	28	28	39	34	31	31	31
Georgia	84	73	77	77	77	95	85	90	90	84
Florida	15	17	18	19	17	18	18	18	19	18
South Atlantic	306	272	276	286	297	314	301	300	317	323
Kentucky	65	61	61	65	69	80	75	75	80	85
Tennessee	88	74	103	127	134	95	87	108	122	130
Alabama	83	77	87	88	90	90	99	87	90	92
Mississippi	87	77	82	90	95	94	91	91	99	99
Arkansas	91	82	90	92	92	125	100	105	103	101
Louisiana	44	37	41	41	42	35	32	32	34	35
Oklahoma	127	101	112	116	116	140	150	180	200	200
Texas	194	194	194	184	184	400	420	220	210	220
South Central	779	703	770	803	822	1, 059	1, 054	898	938	962
Montana	36	35	36	35	37	37	37	38	38	41
Idaho	38	38	40	43	44	40	42	44	48	48
Wyoming	14	15	14	15	15	20	21	19	20	20
Colorado	48	47	48	50	51	58	58	64	61	63
New Mexico	11	13	14	14	14	17	18	18	14	14
Arizona	10	8	10	9	9	13	11	13	13	12
Utah	21	21	21	23	25	22	24	24	26	28
Nevada	6	6	6	6	6	6	6	6	6	6
Washington	57	55	53	58	60	75	72	65	67	68
Oregon	44	44	44	45	46	50	50	45	47	48
California	132	137	142	149	152	125	125	130	137	134
Far Western	417	419	428	447	459	463	464	466	477	482
United States	4, 195	3, 923	4, 059	4, 201	4, 377	4, 722	4, 655	4, 491	4, 651	4, 781

Bureau of Agricultural Economics. Estimates of crop reporting board. Later revised figures for 1928, 1929, and preliminary 1930 may be found in February, 1930, Crops and Markets.

[1] Preliminary.

TABLE 441.—*Purebred dairy cattle: Number registered, each year, by breeds, United States, 1900–1928*

Year	Ayrshire			Guernsey			Holstein-Friesian			Jersey		
	Bulls	Cows	Total	Bulls	Cows	Total	Bulls	Cows	Total	Bulls	Cows	Total
1900	-------	-------	-------	608	896	1, 504	1, 365	3, 381	4, 746	2, 798	8, 750	11, 548
1901	-------	-------	-------	647	1, 172	1, 819	1, 460	3, 648	5, 108	2, 567	8, 045	10, 612
1902	-------	-------	-------	726	1, 267	1, 993	1, 738	4, 252	5, 990	2, 471	7, 580	10, 051
1903	-------	-------	-------	746	1, 289	2, 035	2, 088	4, 753	6, 841	2, 370	7, 240	9, 610
1904	-------	-------	-------	737	1, 261	1, 998	2, 477	5, 567	8, 044	2, 373	7, 464	9, 837
1905	-------	-------	-------	847	1, 612	2, 459	3, 226	6, 547	9. 773	2, 640	7, 735	10, 375
1906	-------	-------	-------	950	1, 964	2, 914	3, 842	7, 918	11, 760	3, 019	8, 652	11, 671
1907	-------	-------	-------	1, 118	1, 966	3, 084	4, 841	9, 809	14, 650	3, 752	9, 383	13, 135
1908	-------	-------	-------	1, 291	2, 191	3, 482	5, 684	10, 850	16, 534	4, 148	10, 135	14, 283
1909	-------	-------	-------	1, 841	3, 836	5, 677	7, 021	12, 570	19, 591	5, 249	12, 513	17, 762
1910	-------	-------	3, 233	2, 420	4, 194	6, 614	9, 689	16, 487	26, 176	6, 333	14, 509	20, 842
1911	-------	-------	4, 798	2, 402	4, 001	6, 403	12, 472	20, 417	32, 889	7, 229	16, 282	23, 511
1912	-------	-------	2, 884	2, 942	4, 578	7, 520	13, 743	23, 792	37, 535	7, 562	16, 591	24, 153
1913	-------	-------	3, 950	3, 653	5, 642	9, 295	16, 364	26, 951	43, 315	9, 147	19, 481	28, 628
1914	-------	-------	4, 912	4, 348	6, 937	11, 285	18, 336	29, 750	48, 086	10, 079	22, 861	32, 940
1915	-------	-------	4, 439	4, 765	6, 535	11, 300	25, 617	42, 063	67, 680	9, 475	22, 957	32, 432
1916	-------	-------	4, 033	5, 030	7, 654	12, 684	26, 116	46, 549	72, 665	10, 242	24, 997	35, 239
1917	-------	-------	4, 944	6, 167	9, 366	15, 533	24, 749	49, 098	73, 847	14, 446	33, 960	48, 406
1918	-------	-------	8, 494	6, 108	9, 356	15, 464	28, 730	59, 549	88, 279	8, 904	25, 398	34, 302
1919	-------	-------	6, 148	7, 648	11, 781	19, 429	30, 298	60, 589	90, 887	10, 906	30, 424	41, 330
1920	-------	-------	6, 809	7, 427	11, 956	19, 383	36, 791	77, 712	114, 503	11, 669	32, 162	43, 831
1921	-------	-------	5, 874	8, 036	13, 971	22, 007	39, 585	88, 265	127, 850	11, 213	31, 123	42, 336
1922	1, 565	4, 816	6, 381	8, 065	14, 007	22, 072	30, 631	83, 141	113, 772	11, 651	33, 801	45, 452
1923	1, 578	5, 975	7, 553	9, 758	16, 976	26, 734	29, 089	86, 043	115, 132	12, 291	38, 159	50, 450
1924	1, 431	5, 508	6, 939	10, 301	18, 166	28, 467	28, 209	83, 320	111, 529	12, 331	39, 832	52, 163
1925	1, 561	5, 972	7, 533	11, 299	20, 742	32, 041	26, 935	82, 659	109, 594	12, 131	41, 725	53, 856
1926	1, 720	6, 142	7, 862	12, 392	22, 298	34, 690	28, 117	82, 971	111, 088	12, 837	42, 915	55, 752
1927	1, 847	6, 554	8, 401	12, 777	22, 694	35, 471	28, 817	81, 146	109, 963	15, 666	48, 411	64, 077
1928	2, 274	7, 837	10, 111	14, 363	24, 664	30, 627	33, 512	88, 214	121, 726	19, 393	54, 516	73, 909
1929	2, 586	8, 833	11, 419	14, 661	26, 288	40, 949	34, 438	89, 927	125, 365	19, 230	52, 431	71, 861

Bureau of Agricultural Economics. Obtained from registry associations.

TABLE 442.—*Cattle: Tuberculin testing under accredited-herd and area plans, 1917–1929*

Year ended June 30—	Cattle tested			Reactors found	Per cent of reactors	Modified accredited counties	Herds accredited [1]	Herds passed one test [1]	Herds under supervision [1]
	Accredited-herd plan	Area plan	Total						
	Number	*Number*	*Number*	*Number*		*Number*	*Number*	*Number*	*Number*
1917	20, 101	---------	20, 101	645	3. 2	--------	--------	--------	--------
1918	134, 143	---------	134, 143	6, 544	4. 9	--------	204	883	--------
1919	329, 878	---------	329, 878	13, 528	4. 1	--------	578	5, 652	--------
1920	700, 670	---------	700, 670	28, 709	4. 1	--------	2, 588	10, 064	--------
1921	1, 366, 358	---------	1, 366, 358	53, 768	3. 9	--------	4, 831	33, 215	71, 806
1922	1, 722, 209	[2] 662, 027	2, 384, 236	82, 569	3. 5	--------	8, 015	111, 719	140, 376
1923	1, 695, 662	1, 765, 187	3, 460, 849	113, 844	3. 3	-----	12, 310	150, 748	187, 915
1924	1, 865, 863	3, 446, 501	5, 312, 364	171, 559	3. 2	38	19, 747	216, 737	305, 809
1925	2, 008, 526	4, 991, 502	7, 000, 028	214, 491	3. 1	51	24, 110	392, 740	414, 620
1926	1, 989, 048	6, 661, 732	8, 650, 780	323, 084	3. 7	109	24, 009	382, 674	435, 840
1927	2, 522, 791	7, 177, 385	9, 700, 176	285, 361	2. 9	149	34, 084	229, 086	261, 148
1928	2, 589, 844	8, 691, 646	11, 281, 490	262, 113	2. 3	180	38, 880	427, 595	473, 218
1929	2, 853, 633	8, 830, 087	11, 683, 720	206, 764	1. 8	213	1, 639	249, 420	281, 323
Total	19, 798, 726	42, 226, 067	62, 024, 793	1, 762, 979	2. 8	[3] 740	170, 995	2, 210, 533	2, 572, 055

Bureau of Animal Industry.

[1] The figures in these columns represent net increases at the close of each year.
[2] Testing during 6 months.
[3] Not including parts of 3 counties and 30 towns.

TABLE 443.—*Cattle: Status of tuberculosis-eradication work, by States, June 30, 1929*

State	Accredited-herd work			Eradication from areas [1]			Total tuberculin tests, 1917 to June 30, 1929		
	Herds accredited	Herds passed one test	Herds under supervision	Modified accredited counties	Counties completing one or more tests of all cattle [2]	Total counties engaged in testing [2]	Total cattle	Reactors: Number	Reactors: Per cent
Alabama	305	5,598	8,191	0	0	0	391,832	2,249	0.6
Arizona	45	8,243	8,319	0	0	2	262,141	6,515	2.5
Arkansas	17	2,893	9,126	1	1	1	85,457	415	.5
California	117	6,580	6,749	2	5	7	516,957	5,417	1.0
Colorado	165	947	1,450	0	0	1	92,455	2,088	2.3
Connecticut	2,586	3,761	7,042	0	0	4	503,889	41,434	8.2
Delaware	2,094	3,509	6,380	0	1	1	156,488	12,664	8.1
District of Columbia	8	99	107	0	1	1	13,324	123	.9
Florida	202	7,901	8,734	0	2	2	323,297	3,630	1.1
Georgia	27	25,463	25,496	10	14	17	326,533	3,127	1.0
Idaho	56	33,468	36,693	27	27	39	668,932	4,170	.6
Illinois	5,384	142,547	160,516	43	43	76	4,716,594	190,718	4.0
Indiana	27,875	126,689	173,721	64	65	78	2,220,744	27,781	1.2
Iowa	3,157	105,640	172,700	44	54	64	5,905,005	148,453	2.5
Kansas	836	82,717	84,094	41	41	47	1,308,223	11,930	.9
Kentucky	60	71,564	73,378	18	51	61	650,403	5,990	.9
Louisiana	17	8,080	8,450	0	0	0	330,519	6,906	2.1
Maine	699	43,008	43,817	16	16	16	674,276	7,330	1.1
Maryland	7,153	15,127	28,285	1	7	16	820,904	52,507	6.4
Massachusetts	1,390	2,084	4,191	1	1	2	324,138	38,680	11.9
Michigan	72	166,890	169,654	65	70	76	3,548,859	61,103	1.7
Minnesota	9,142	79,388	92,496	24	38	38	4,964,541	111,541	2.2
Mississippi	27	5,205	5,232	5	6	7	287,484	1,441	.5
Missouri	227	71,686	75,377	9	9	13	971,055	7,316	.8
Montana	91	31,429	31,897	[3] 11	[3] 11	14	848,465	6,714	.8
Nebraska	105	67,210	67,566	37	39	43	2,162,992	26,899	1.2
Nevada	11	1,235	1,546	0	0	12	151,229	2,103	1.4
New Hampshire	3,942	2,059	6,123	1	1	5	427,855	23,540	5.5
New Jersey	2,829	3,915	9,876	0	0	0	384,949	24,456	6.4
New Mexico	23	2,051	2,132	0	0	13	70,588	407	.6
New York	68,138	27,049	105,371	8	19	48	4,651,855	395,258	8.5
North Carolina	394	256,530	257,311	100	100	100	811,608	3,939	.5
North Dakota	5,149	52,394	63,667	26	30	39	1,774,278	21,860	1.2
Ohio	543	174,315	181,092	35	44	59	2,281,691	73,682	3.2
Oklahoma	288	129	440	0	0	0	214,527	3,921	1.8
Oregon	465	50,970	51,457	7	13	27	1,108,530	12,260	1.1
Pennsylvania	5,302	105,350	123,598	20	22	57	2,857,668	131,056	4.6
Rhode Island	101	170	419	0	0	0	40,959	5,148	12.6
South Carolina	102	59,380	59,546	12	12	14	282,749	1,552	.5
South Dakota	1,256	8,687	10,137	5	5	5	721,849	13,608	1.9
Tennessee	169	62,028	62,328	11	11	12	521,383	2,665	.5
Texas	248	553	912	0	0	0	300,574	3,708	1.2
Utah	99	10,724	11,563	1	2	24	527,572	5,058	1.0
Vermont	6,844	5,495	22,343	([4])	([4])	8	1,129,460	44,581	3.9
Virginia	1,277	20,639	22,187	25	26	33	703,772	12,817	1.8
Washington	86	41,589	45,300	[5] 9	[5] 12	29	1,137,395	29,728	2.6
West Virginia	1,190	48,248	50,052	18	20	25	438,531	5,059	1.2
Wisconsin	10,678	149,349	163,688	43	60	65	6,825,976	148,584	2.2
Wyoming	4	9,948	11,306	0	0	0	143,338	1,114	.8
Alaska							1,492	38	2.5
Hawaii							73,517	1,529	2.1
Interstate testing							1,361,042	7,983	.6
Indian schools [6]							413	27	6.5
Purebreds in United States [6]							4,486	157	3.5
Total	170,995	2,210,533	2,572,055	[7] 740	[7] 879	1,201	62,024,793	1,762,979	2.8

Bureau of Animal Industry.

[1] Accredited-herd work began 1917; area work, 1921.
[2] Including District of Columbia.
[3] Not including part of 1 county.
[4] Not including 30 towns.
[5] Not including part of 2 counties.
[6] Testing in United States before work organized by States.
[7] Not including parts of 3 counties and 30 towns.

TABLE 444.—*Number of dairy-herd improvement associations, 1906–1930*

State	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1925	1926	1927	1928	1929	1930
Michigan	1	4	2	5	4	3	4	4	3	3	10	15	7	13	14	11	17	53	105	108	102	105	94	90
Maine	---	---	3	4	3	6	5	4	5	8	11	5	1	0	0	0	3	4	2	1	0	0	0	5
New York	---	---	1	1	3	9	18	21	29	35	47	43	19	25	28	24	31	27	24	28	36	42	54	51
Vermont	---	---	---	2	8	10	11	17	28	33	38	47	18	12	18	17	21	20	17	23	23	25	23	23
Iowa	---	---	---	2	5	4	8	7	8	13	23	30	15	11	14	17	22	47	56	61	77	86	101	101
California	---	---	---	1	3	2	4	4	5	7	9	15	16	14	18	21	21	27	20	30	35	32	32	33
Wisconsin	---	---	---	9	10	10	8	11	24	37	51	81	112	105	115	103	127	151	176	169	159	166	154	142
Nebraska	---	---	---	1	0	0	0	3	2	3	4	4	2	2	0	0	1	4	2	6	10	17	23	28
Colorado	---	---	---	---	1	1	2	1	1	0	0	3	5	5	5	4	6	6	7	6	5	9	14	15
Pennsylvania	---	---	---	---	1	1	2	2	7	14	19	24	21	35	64	46	45	36	42	43	49	65	76	88
Ohio	---	---	---	---	1	0	0	1	4	5	20	30	24	24	41	35	36	36	21	25	28	29	39	38
Washington	---	---	---	---	1	3	1	0	0	1	12	18	11	9	6	10	10	11	10	8	11	10	12	15
Maryland	---	---	---	---	---	1	3	3	2	4	7	8	4	2	6	7	6	4	9	10	8	7	8	9
Illinois	---	---	---	---	---	4	3	2	7	3	3	17	15	27	23	25	24	23	24	26	30	34	51	59
Minnesota	---	---	---	---	---	3	7	10	9	11	22	26	23	21	19	23	37	55	88	84	85	105	117	120
New Hampshire	---	---	---	---	---	1	1	1	4	8	11	12	8	9	10	10	11	10	5	4	2	4	7	7
Oregon	---	---	---	---	---	1	1	1	7	11	15	17	11	6	9	5	5	4	7	8	9	11	14	14
Utah	---	---	---	---	---	1	0	0	1	1	0	1	1	0	1	1	1	4	5	4	5	5	5	8
Massachusetts	---	---	---	---	---	2	2	2	3	0	4	4	0	0	1	5	6	6	3	6	7	9	11	11
Virginia	---	---	---	---	---	2	2	2	0	0	2	4	4	5	8	10	12	13	15	18	18	20	20	20
Kansas	---	---	---	---	---	---	---	1	1	1	1	4	3	15	13	13	13	9	8	11	13	14	20	22
Indiana	---	---	---	---	---	---	---	2	2	3	7	9	7	10	5	10	5	10	17	25	31	34	41	51
Kentucky	---	---	---	---	---	---	---	1	1	0	1	1	0	0	5	5	2	3	2	0	2	[1]	8	12
Missouri	---	---	---	---	---	---	---	---	2	1	2	5	4	5	6	7	11	12	13	19	21	25	34	36
New Jersey	---	---	---	---	---	---	---	---	2	3	4	8	9	9	12	8	6	6	6	9	11	17	18	16
West Virginia	---	---	---	---	---	---	---	---	1	1	3	1	1	1	3	5	5	6	3	3	3	4	6	7
Connecticut	---	---	---	---	---	---	---	---	1	3	6	3	0	0	1	0	2	1	1	2	4	5	3	4
North Carolina	---	---	---	---	---	---	---	---	2	0	0	0	0	0	2	2	0	0	2	5	5	5	8	7
Louisiana	---	---	---	---	---	---	---	---	1	0	0	0	0	0	1	0	0	0	0	0	1	2	2	2
South Dakota	---	---	---	---	---	---	---	---	1	1	3	3	0	0	0	0	0	4	11	9	10	8	14	12
Nevada	---	---	---	---	---	---	---	---	---	1	0	1	0	0	0	1	1	4	3	1	3	0	1	0
Arizona	---	---	---	---	---	---	---	---	---	---	2	2	1	0	0	2	1	1	2	1	1	2	3	4
Rhode Island	---	---	---	---	---	---	---	---	---	---	2	2	0	0	4	4	4	3	0	0	0	0	1	1
Delaware	---	---	---	---	---	---	---	---	---	---	2	3	2	2	1	0	0	0	0	0	0	0	1	1
Idaho	---	---	---	---	---	---	---	---	---	---	2	1	1	4	5	6	4	8	8	8	9	12	13	13
Mississippi	---	---	---	---	---	---	---	---	---	---	1	0	0	0	0	3	2	1	1	2	0	1	1	2
Montana	---	---	---	---	---	---	---	---	---	---	1	2	0	0	0	0	0	2	4	3	7	7	8	9
Tennessee	---	---	---	---	---	---	---	---	---	---	1	8	4	6	3	3	4	2	2	2	2	3	7	10
New Mexico	---	---	---	---	---	---	---	---	---	---	---	1	0	0	0	1	1	1	0	1	1	2	2	1
Wyoming	---	---	---	---	---	---	---	---	---	---	---	1	0	1	0	0	0	0	1	0	0	0	1	1
Alabama	---	---	---	---	---	---	---	---	---	---	---	---	2	1	3	1	1	0	0	0	1	3	4	7
Georgia	---	---	---	---	---	---	---	---	---	---	---	---	1	0	0	0	0	0	0	0	1	1	2	1
North Dakota	---	---	---	---	---	---	---	---	---	---	---	---	1	1	1	2	6	8	5	3	6	4	7	9
Oklahoma	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	2	1	3	5	5	5	12	22	25
South Carolina	---	---	---	---	---	---	---	---	---	---	---	---	---	1	1	1	0	0	0	0	0	0	1	3
Texas	---	---	---	---	---	---	---	---	---	---	---	---	---	3	0	0	0	0	0	0	1	3	6	7
Arkansas	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	2	2	2	0	0	0	2	[1]	1
Florida	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1	2
Total	1	4	6	25	40	64	82	100	163	211	346	459	353	385	468	452	513	627	732	777	837	947	1,090	1,143

Bureau of Dairy Industry. Up to and including 1923 data were collected on July 1. Beginning with 1924 reports are made by calendar years. Last 6 columns give data for Jan. 1.

[1] No report

TABLE 445.—*Milk cows: Estimated average price* [1] *per head received by producers, 15th of month, United States, 1910–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Average
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	41.18	40.35	41.75	42.22	42.38	43.46	42.86	42.77	42.68	43.20	43.34	43.41	42.47
1911	44.70	44.48	45.42	44.81	44.54	43.86	42.44	42.26	42.22	42.69	42.70	42.72	43.57
1912	42.89	43.40	44.09	45.14	45.63	45.84	45.41	46.11	46.79	47.30	47.38	48.62	45.72
1913	49.51	51.42	54.02	55.34	54.80	55.20	54.80	54.78	55.78	56.47	57.71	57.19	54.75
1914	57.99	59.09	59.23	59.60	59.85	59.82	59.67	60.72	59.58	59.53	58.77	58.23	59.34
1915	58.47	57.99	58.00	57.78	58.29	58.59	60.31	58.34	58.38	58.76	57.35	56.79	58.25
1916	57.79	57.99	59.51	60.68	60.98	61.63	62.04	61.32	61.41	62.19	62.67	63.18	60.95
1917	63.92	65.93	68.46	72.09	72.78	72.87	72.81	72.53	73.93	75.79	75.00	76.16	71.86
1918	76.54	78.36	80.71	82.45	84.11	84.74	84.97	84.06	85.21	85.41	84.51	85.78	83.07
1919	86.10	86.15	88.15	90.91	93.43	93.84	94.51	94.72	93.42	93.43	93.27	95.54	91.96
1920	94.42	95.27	94.94	95.36	94.56	94.56	91.23	90.50	89.40	85.90	77.56	70.42	89.51
1921	66.82	63.44	65.37	64.35	62.63	59.89	56.55	55.85	54.33	53.39	53.28	53.30	59.10
1922	52.83	53.54	54.87	54.46	54.76	54.87	54.20	52.67	52.79	52.86	51.62	53.21	53.56
1923	54.01	54.15	55.29	56.14	55.91	56.34	56.22	55.45	56.13	55.51	55.39	54.66	55.43
1924	55.57	55.49	55.88	55.92	56.37	56.45	55.46	55.74	55.54	54.30	55.05	54.00	55.48
1925	54.81	54.79	56.19	56.85	57.88	57.79	57.95	58.26	58.68	60.17	60.69	60.38	57.87
1926	62.06	63.41	63.17	65.65	66.63	66.74	66.68	65.37	66.12	66.26	66.91	66.74	65.51
1927	66.77	68.22	70.18	71.98	72.43	74.19	74.15	74.24	76.10	78.62	81.09	82.36	74.19
1928	83.11	86.34	87.95	88.55	89.00	89.90	90.37	90.43	92.56	92.86	93.05	92.87	89.75
1929	91.54	91.77	92.80	93.55	94.94	95.29	96.34	95.26	95.55	95.12	94.48	92.61	94.10

Bureau of Agricultural Economics. Monthly prices weighted by number of milk cows Jan. 1, by States; yearly price is a straight average of 12 months.

[1] As reported by county dealers.

TABLE 446.—*Dairy products: Quantity produced, 1921–1928*

Product	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Creamery butter	1, 054, 938	1, 153, 515	1, 252, 214	1, 356, 080	1, 361, 526	1, 451, 766	1, 496, 495	1, 487, 049
Whey butter (made from whey cream)	2, 176	2, 291	1, 904	1, 665	1, 774	2, 872	1, 217	1, 097
Renovated or process butter	5, 877	4, 448	2, 802	2, 813	2, 519	2, 505	4, 286	2, 716
American cheese:								
Whole milk	261, 727	282, 806	308, 108	324, 695	347, 240	335, 915	307, 777	335, 253
Part skim	1, 455	2, 164	2, 145	2, 470	2, 793	2, 927	3, 390	2, 900
Full skim	1, 733	2, 500	2, 033	1, 605	3, 298	1, 384	1, 888	3, 048
Swiss cheese (including block)	22, 678	19, 983	24, 555	21, 844	23, 457	20, 883	18, 141	16, 718
Brick and Munster cheese	42, 073	37, 194	33, 250	32, 052	34, 101	31, 048	31, 546	28, 960
Limburger cheese	7, 035	7, 383	7, 100	9, 734	9, 163	9, 639	8, 842	7, 437
Cream and Neufchatel cheese	9, 279	9, 936	10, 334	14, 945	17, 575	18, 192	25, 962	30, 589
All Italian varieties of cheese	3, 793	2, 627	2, 132	1, 973	1, 562	2, 425	3, 377	3, 587
All other varieties of cheese	6, 065	5, 387	5, 040	4, 622	4, 325	5, 003	5, 763	9, 027
Cottage, pot, and bakers' cheese	27, 316	32, 389	35, 527	54, 347	59, 485	67, 977	75, 679	87, 525
Condensed milk (sweetened):								
Case goods—								
Skimmed	3, 861	3, 915	2, 748	2, 044	3, 135	1, 298	1, 623	1, 366
Unskimmed	199, 985	230, 456	196, 058	187, 281	186, 807	154, 944	161, 355	139, 077
Bulk goods—								
Skimmed	66, 051	76, 049	102, 236	96, 581	114, 198	147, 473	143, 722	154, 723
Unskimmed	22, 324	30, 292	44, 860	47, 429	44, 758	55, 737	39, 668	38, 660
Total condensed milk	292, 221	340, 712	345, 902	333, 335	348, 898	359, 452	346, 368	333, 826
Evaporated milk (unsweetened):								
Case goods—								
Skimmed	1, 405	3, 574	7, 035	11, 555	5, 994	11, 985	8, 100	10, 618
Unskimmed	1, 028, 172	949, 909	1, 252, 520	1, 189, 755	1, 202, 456	1, 158, 476	1, 273, 815	1, 337, 022
Bulk goods—								
Skimmed	69, 220	67, 066	77, 416	83, 131	86, 954	116, 758	126, 085	147, 625
Unskimmed	73, 145	70, 088	92, 008	82, 772	113, 556	86, 833	101, 354	89, 336
Total evaporated milk	1, 171, 942	1, 090, 637	1, 428, 979	1, 367, 213	1, 408, 960	1, 374, 052	1, 509, 354	1, 584, 601
Condensed or evaporated buttermilk	29, 314	44, 343	54, 833	66, 837	77, 079	86, 687	99, 180	102, 452
Dried or powdered buttermilk	7, 708	9, 007	13, 032	18, 058	20, 246	31, 378	38, 435	45, 502
Powdered whole milk	4, 242	5, 599	6, 560	7, 887	8, 931	10, 768	11, 464	9, 605
Powdered skimmed milk	38, 546	40, 617	62, 251	69, 219	73, 317	91, 718	118, 123	147, 996
Powdered cream	130	118	328	1, 018	339	331	338	673
Dried casein (skim milk or buttermilk product)	8, 076	6, 927	14, 548	20, 759	16, 660	16, 953	18, 033	22, 151
Malted milk	15, 652	13, 659	15, 331	15, 889	18, 050	20, 673	22, 116	21, 128
Milk sugar (crude)	2, 890	2, 191	2, 872	3, 331	5, 655	4, 476	4, 077	5, 323
Ice cream of all kinds (gallons)	147, 949	161, 609	173, 412	181, 564	214, 382	215, 248	226, 756	232, 185

Bureau of Agricultural Economics. Compiled from reports of factories made direct to the bureau.

NOTE.—A table similar to Table 428, 1927 Yearbook, milk production and utilization, is omitted.

TABLE 447.—*Dairy products: Quantity produced 1928, by months*

Manufactured product	Total, 1928	January	February	March	April	May	June	July	August	September	October	November	December
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
Creamery butter	1,487,049	101,045	99,394	111,777	118,849	156,294	181,037	167,601	145,430	119,499	105,894	87,745	92,484
Whey butter (made from whey cream)	1,097	66	64	75	91	117	130	105	101	89	103	82	74
Renovated or process butter	2,716	232	174	246	175	236	199	225	273	231	234	252	239
American cheese:													
Whole milk	335,253	18,010	19,005	23,451	28,221	37,324	45,012	40,072	34,229	30,342	25,134	18,013	16,440
Part skim	2,900	208	198	276	302	364	322	274	177	153	178	196	252
Full skim	3,048	220	236	277	129	230	229	192	205	197	495	369	269
Swiss cheese (including block)	16,718	225	224	332	762	2,101	2,955	2,758	2,402	2,094	1,756	813	296
Brick and Munster cheese	28,960	2,125	2,135	1,718	2,893	2,979	3,066	2,412	2,062	2,206	2,515	2,419	2,429
Limburger cheese	7,437	443	453	552	454	873	929	804	699	701	647	499	383
Cream and Neufchatel cheese	30,589	2,700	2,711	2,791	2,482	2,617	2,584	2,312	2,212	2,210	2,576	2,709	2,685
All Italian varieties	3,587	295	295	380	365	351	309	271	248	261	283	239	290
All other varieties	9,027	754	784	825	740	835	830	697	714	733	783	697	635
Cottage, pot, and bakers' cheese	87,525	6,971	6,793	8,017	7,986	9,041	8,435	7,390	6,894	6,612	6,650	6,386	6,350
Condensed milk (sweetened):													
Case goods—													
Skimmed	1,366	163	87	80	149	109	100	115	77	109	172	54	151
Unskimmed	139,077	11,401	12,279	14,396	13,820	12,993	11,627	11,109	12,267	11,970	9,632	6,608	10,975
Bulk goods—													
Skimmed	154,723	10,148	10,400	13,415	15,439	20,361	24,261	14,043	10,694	11,425	8,437	6,670	9,430
Unskimmed	38,660	3,334	2,842	3,641	2,860	4,916	6,514	2,751	2,116	2,515	2,879	2,053	2,239
Evaporated milk (unsweetened):													
Case goods—													
Skimmed	10,618	8	10	13	3,114	3,536	3,925	----	----	----	10	2	----
Unskimmed	1,337,022	88,582	97,816	116,293	125,380	154,344	179,584	142,009	109,956	94,966	82,968	67,584	77,540
Bulk goods—													
Skimmed	147,625	9,467	10,154	12,240	11,842	15,460	16,714	17,870	16,225	12,723	9,068	7,736	8,126
Unskimmed	89,336	4,698	5,002	6,533	8,473	11,337	12,644	9,980	9,025	6,680	5,682	4,935	4,347
Concentrated skim milk, feed	20,982	1,540	1,600	2,613	3,338	3,961	2,220	1,371	983	882	838	752	884
Condensed or evaporated buttermilk	102,452	6,213	6,263	6,880	7,544	11,541	13,643	11,862	10,408	8,776	7,308	5,893	6,121
Dried or powdered buttermilk	45,502	3,121	3,312	3,706	3,887	4,726	5,365	4,895	4,337	3,381	3,077	2,727	2,968
Powdered whole milk	9,605	508	742	744	634	1,200	2,076	1,694	805	620	277	185	120
Powdered skim milk	147,996	10,459	10,641	13,008	14,862	17,979	18,856	13,644	10,491	9,880	9,437	8,398	10,341
Powdered cream	673	19	33	8	139	249	170	6	----	32	----	3	14
Dried casein	22,151	1,352	1,438	1,900	2,411	2,564	2,916	2,399	1,910	1,882	1,228	958	1,193
Malted milk	21,128	1,799	1,842	2,196	2,098	2,224	2,162	1,681	1,391	1,445	1,536	1,450	1,304
Milk sugar (crude)	5,323	342	360	440	617	690	722	479	390	367	361	247	308
Ice cream of all kinds (gallons)	232,185	9,200	9,843	13,500	16,226	25,625	29,306	38,283	35,026	20,558	14,715	10,435	9,468

Bureau of Agricultural Economics. Compiled from reports made direct to the bureau.

TABLE 448.—*Fluid milk and fluid cream: Receipts at New York, by State of origin, 1927–1929, and by months, 1929*

[40-quart units][1]

State of origin	1927	1928	1929												
			Total	January	February	March	April	May	June	July	August	September	October	November	December
Fluid milk															
Connecticut	162,613	82,720	125,890	6,624	9,174	9,584	8,086	13,709	13,105	7,498	4,882	10,516	14,088	14,958	13,666
Massachusetts	131,577	126,443	109,452	8,765	8,175	8,301	11,742	12,851	12,322	9,517	7,610	8,489	7,943	6,766	6,971
Maryland	43,632	66,164	139,230	15,369	13,995	13,319	11,328	8,266	8,179	8,291	8,127	8,973	11,985	16,078	15,320
New Jersey	2,051,503	1,700,809	1,380,211	135,818	118,566	127,575	126,763	132,902	126,988	109,791	94,890	95,783	104,526	101,066	105,543
New York	27,521,242	27,098,784	26,748,404	2,144,159	1,957,166	2,232,858	2,142,063	2,234,858	2,364,100	2,361,260	2,311,941	2,330,918	2,313,055	2,166,420	2,189,606
Ohio	------	------	6,090	------	------	------	------	------	------	------	------	4,523	1,405	162	------
Pennsylvania	3,652,306	4,408,705	4,850,724	403,771	372,613	384,744	348,695	386,416	397,616	373,723	384,783	398,526	442,535	491,124	466,178
Vermont	889,847	1,068,937	1,321,577	91,577	81,181	101,663	103,803	108,646	120,075	140,219	131,280	115,678	110,616	111,085	105,744
Canada	------	------	32,553	------	------	170	3,597	157	------	100	83	6,435	7,936	7,549	6,526
Other	1,396	2,229	------	------	------	------	------	------	------	------	------	------	------	------	------
Total	34,454,116	34,554,791	34,714,131	2,806,083	2,560,870	2,878,214	2,756,077	2,897,805	3,042,385	3,010,399	2,943,606	2,979,841	3,014,089	2,915,208	2,909,554
Fluid cream															
Arkansas	------	------	4,753	------	203	1,078	854	609	603	600	603	203			
Connecticut	114	282	2,929	------	------	------	------	------	------	------	493	608	490	696	642
Delaware	------	99	------	------	------	------	------	------	------	------	------	------	------	------	------
Illinois	953	2,688	400	------	------	------	------	------	------	------	------	------	------	400	------
Indiana	2,935	7,794	12,517	200	1,200	1,225	1,475	2,273	2,000	1,000	1,050	1,142	320	560	72
Iowa	10,962	23,117	4,343	400	400	200	1,526	------	600	800	417	------	------	------	------
Kansas	------	------	600	200	------	------	------	200	200	------	------	------	------	------	------
Kentucky	------	200	8,500	------	810	1,044	634	1,250	419	1,335	694	863	834	617	------
Massachusetts	2,510	2,434	3,594	365	335	450	114	149	217	399	284	177	255	320	529
Maryland	------	613	1,077	57	136	120	------	------	50	------	75	------	60	544	35
Michigan	4,813	2,920	200	------	------	------	200	------	------	------	------	------	------	------	------
Minnesota	7,568	11,599	13,072	788	600	1,600	2,200	1,000	800	1,600	1,600	1,017	200	850	817
Missouri	------	2,269	6,889	908	406	------	405	1,003	1,167	1,200	------	800	200	400	400
New Jersey	39,990	41,900	15,949	1,130	1,511	1,702	1,288	2,076	2,814	1,038	705	873	1,016	708	1,088
New York	1,192,527	1,285,635	1,323,875	82,940	84,308	109,995	118,195	141,652	166,240	129,838	110,407	108,170	98,024	86,595	87,511
Ohio	1,800	11,170	23,092	1,150	1,866	1,898	1,323	2,284	4,662	4,410	2,178	811	543	792	1,175
Pennsylvania	197,678	183,852	246,430	17,062	16,306	19,158	23,979	32,358	29,438	23,865	18,484	18,598	17,345	14,996	14,841
Tennessee	210	7,767	16,446	1,708	1,722	1,700	1,588	1,650	1,278	2,585	2,348	1,085	348	217	217
Virginia	------	33	------	------	------	------	------	------	------	------	------	------	------	------	------
Vermont	73,738	96,830	71,267	3,536	3,433	5,341	5,602	8,332	9,862	8,062	6,776	5,906	4,452	3,833	6,132
Wisconsin	24,720	16,549	34,524	3,075	3,797	2,400	1,959	1,843	2,409	1,802	4,610	4,046	3,528	3,000	2,055
Canada	10,857	4,908	36,035	186	127	1,182	2,302	3,640	5,899	6,372	5,355	4,582	3,065	1,929	1,396
Texas	------	------	424	------	------	------	------	------	------	------	------	------	------	200	224
Total	1,571,375	1,702,659	1,826,916	113,705	117,160	149,093	163,644	200,319	228,658	184,906	156,079	148,881	130,680	116,657	117,134

Bureau of Agricultural Economics.

[1] 40-quart units equal 10 gallons, or about 86 pounds for milk and about 82.5 pounds for cream.

TABLE 449.—*Fluid milk and fluid cream: Receipts at Philadelphia by State of origin—1929*

[40 quart units] [1]

State of origin	1929 Total	January	February	March	April	May	June	July	August	September	October	November	December
Fluid milk													
Delaware	652,876	55,468	50,326	56,629	60,854	66,036	58,452	50,932	50,120	49,143	51,560	48,519	54,837
Indiana	17,028									6,599	2,947	5,643	1,839
Maryland	957,363	78,996	69,244	78,677	75,996	81,506	90,431	80,866	81,711	94,329	78,699	75,926	70,982
New Jersey	579,825	61,545	52,981	50,646	45,890	54,409	53,147	45,875	43,013	43,188	44,580	42,597	41,954
New York	6,354							3,212	3,142				
Ohio	3,104									2,404	700		
Pennsylvania	5,143,314	386,611	388,180	447,786	429,184	438,328	439,395	435,725	430,139	415,186	453,567	433,497	445,716
Virginia	1,607							600	600	407			
West Virginia	72,869	5,320	4,393	4,353	4,674	6,519	5,521	7,526	6,105	6,185	3,572	8,257	4,444
Wisconsin	720									620	100		
Total	7,435,060	587,940	565,124	638,091	616,598	646,798	647,946	624,736	614,830	618,061	640,725	614,439	619,772
Fluid cream													
Arkansas	1,813					406	803	400		204			
Delaware	2,777	31	155	204	314	655	647	80	185	80	233		190
Illinois	4,341	425		507	400	450	140	100	302	1,617		200	200
Indiana	59,026	3,703	3,434	5,003	4,429	4,874	4,479	6,706	6,280	5,340	4,564	5,404	4,810
Iowa	3,753	623	200	400	700		830	800	200				
Kansas	2,000	200	400		400	400	200			400			
Kentucky	4,220	400	600	366	200	204				600	200	1,000	650
Maryland	38,947	1,692	1,838	2,190	2,974	5,230	5,039	3,451	3,014	2,089	3,955	3,266	4,209
Michigan	2,406	1,400	200		206		600						
Minnesota	53,810	2,220	2,040	6,346	6,964	4,440	6,800	5,400	5,800	8,300	4,200	1,200	100
Mississippi	400									200		200	
Missouri	27,041	862	1,897	2,009	3,283	5,989	3,724	3,642	2,277	2,251	200	907	
New Jersey	2,090	279	275	636	377	390		19			15	15	84
New York	50		50										
Ohio	33,847	4,662	2,422	3,473	2,400	2,362	2,200	4,141	3,948	3,573	2,095	1,300	1,271
Oklahoma	1,673		225		400	400		200				224	224
Pennsylvania	48,167	3,382	2,572	2,762	4,229	7,023	6,796	6,644	4,574	2,312	3,320	1,964	2,589
Tennessee	3,221	400						418	200	405	200	398	1,200
Texas	1,318				200	427			441			250	
Virginia	16,691	498	267	583	611	2,689	2,618	2,606	2,726	1,114	630	796	1,553
West Virginia	476						134						342
Wisconsin	86,589	4,312	4,709	7,196	9,603	6,005	7,791	11,107	11,780	9,667	5,898	4,991	3,530
District of Columbia	200						200						
Total	394,856	25,092	21,284	31,675	37,690	41,944	43,001	45,714	41,727	38,152	25,510	22,115	20,952

Bureau of Agricultural Economics.

[1] 40-quart units equal 10 gallons, or about 86 pounds for milk and 82.5 pounds for cream.

TABLE 450.—*Condensed and evaporated milk: International trade, average 1909–1913, annual 1925–1928*

Country	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Netherlands	[1] 23	55	288	248, 676	389	293, 046	278	324, 800	359	354, 572
United States	0	[2] 16,200	4, 621	147, 763	1, 663	114, 549	2, 623	103, 028	2, 609	115, 551
Denmark	[1 2] 5	[3] 4, 724	56	58, 762	2	56, 734	14	55, 304	0	52, 598
Switzerland	201	80, 539	68	67, 555	71	73, 940	11	81, 234	14	82, 252
Canada	259	4, 575	119	40, 614	152	24, 775	125	33, 680	137	27, 118
Australia	4, 463	727	[1] 42	[1] 19,951	[1] 130	[1] 31,217	[1] 96	[1] 16,025	-------	-------
Norway	3	32, 106	1, 173	16, 848	1, 055	24, 483	747	16, 698	650	18, 747
Italy	806	5, 913	771	17, 322	715	11, 073	1, 335	8, 905	1, 719	7, 092
Irish Free State	0	0	2, 442	6, 569	1, 659	9, 169	1, 494	6, 302	1, 282	10, 746
New Zealand	261	132	93	1, 144	7	1, 225	3	1, 557	3	1, 367
Lithuania	0	0	1	1, 958	[1] 62	5, 782	[1] 83	8, 888	0	12, 655
Czechoslovakia	0	0	759	1, 138	421	640	141	315	227	2, 754
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	121, 175	48, 221	250, 572	14, 497	269, 682	14, 287	283, 789	27, 771	299, 039	24, 878
Cuba	28, 457	0	47, 316	0	48, 567	0	50, 586	0	-------	-------
Germany [3]	66	12, 080	28, 372	1, 428	12, 036	1, 681	13, 434	980	13, 290	1, 477
France	2, 458	4, 140	17, 369	4, 803	13, 551	7, 607	11, 299	9, 454	13, 126	13, 908
Dutch East Indies	[4] 13, 049	89	20, 009	77	24, 301	0	26, 149	0	[5] 11,179	0
Philippine Islands	12, 311	0	22, 533	0	24, 142	0	25, 974	0	26, 524	0
Japan	10, 061	0	9, 429	284	9, 641	213	9, 510	399	8, 411	3, 492
British India	11, 236	0	14, 124	0	18, 980	0	24, 933	0	26, 354	0
Union of South Africa	21, 227	0	9, 922	16	11, 122	16	11, 330	20	12, 020	19
China	4, 484	0	10, 117	0	11, 994	0	11, 095	0	14, 643	0
Peru	[1 2] 2,038	0	9, 359	0	8, 886	0	7, 629	0	8, 444	0
Austria	[1 6] 323	[1 6] 79	1, 154	27	1, 358	64	1, 105	254	1, 205	305
Greece	[1] 176	[1] 0	5, 359	0	5, 111	0	7, 052	0	8, 203	0
Indo-China	[1] 2, 437	[1] 72	4, 388	191	5, 995	252	5, 955	174	7, 603	-------
Siam [7]	0	0	4, 833	0	4, 788	0	6, 617	0	0	-------
Jamaica [1]	2, 860	0	3, 387	0	3, 803	0	4, 103	0	0	-------
Belgium [3]	0	0	4, 260	1, 096	3, 370	1, 312	2, 915	2, 615	3, 698	3, 542
Trinidad and Tobago	[1] 37	0	2, 383	0	2, 836	0	3, 132	0	-------	-------
Algeria	[1] 143	[1] 38	3, 047	66	2, 725	229	[1] 3, 682	[1] 129	-------	-------
Tunis	[1,2] 1,334	0	1, 844	0	1, 828	0	2. 644	0	-------	-------
Poland	0	0	442	128	79	2	263	22	464	18
Egypt	[8] 1, 628	0	1, 173	253	1, 339	289	1, 395	351	1, 347	368
Argentina	742	0	1, 187	5	1, 524	13	1, 446	28	-------	-------
Brazil	8, 694	0	761	0	1, 838	0	1, 947	0	-------	0
Total, 36 countries	250, 957	209, 690	483, 753	651, 171	495, 822	672, 598	524, 934	698, 933	462, 550	733, 459

Bureau of Agricultural Economics. Official sources, except where otherwise stated.

[1] International Yearbook of Agricultural Statistics.
[2] 4-year average.
[3] Includes some powdered milk.
[4] 3-year average.
[5] Java and Madura only.
[6] Average for Austria-Hungary.
[7] Figures for Siam are for 12 months ended Mar. 31 of the year following year shown.
[8] 1 year only.

TABLE 451.—*Milk, wholesale: Estimated average price per 100 pounds received by producers, United States, 1923–1929*

Year	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15
	Dolls.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1923	-------	-------	-------	-------	-------	-------	-------	-------	2. 81	2. 98	3. 02	2. 92
1924	2. 86	2. 84	2. 75	2. 50	2. 40	2. 40	2. 29	2. 18	2. 35	2. 43	2. 45	2. 55
1925	2. 48	2. 55	2. 62	2. 48	2. 47	2. 47	2. 45	2. 55	2. 56	2. 73	2. 69	2. 65
1926	2. 74	2. 68	2. 56	2. 46	2. 39	2. 35	2. 40	2. 37	2. 47	2. 46	2. 60	2. 61
1927	2. 68	2. 64	2. 55	2. 58	2. 51	2. 44	2. 40	2. 36	2. 48	2. 55	2. 56	2. 64
1928	2. 67	2. 69	2. 61	2. 51	2. 49	2. 45	2. 45	2. 46	2. 56	2. 60	2. 63	2. 65
1929	2. 64	2. 64	2. 63	2. 59	2. 53	2. 47	2. 46	2. 50	2. 52	2. 55	2. 60	2. 60

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number of milk cows Jan. 1. Prices quoted are to dealers, factories, etc.

TABLE 452.—*Milk, standard or grade B: Retail price per quart, delivered to family trade, New York, Chicago, New Orleans, and San Francisco, 1920–1929*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
New York:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1920	18	16½	16½	15	15	15	16	17	18	18	18	17
1921	17	16	15	------	------	14	14	15	15	15	15	15
1922	15	15	15	------	13	13	14	15	15	15	15	16
1923	16	15	15	15	14	14	14	14	15	15	16	15
1924	15	14	14	14	13	13	13	13	14	14	15	15
1925	15	15	15	15	15	14	14	15	15	15	15	15
1926	15	15	15	15	15	15	15	15	15	15	15	15
1927	15	15	15	15	15	15	15	15	16	16	16	16
1928	16	16	15	15	15	15	15	16	16	16	16	16
1929	16	16	16	16	16	16	16	16	16	16	16	16
Chicago:												
1920	15	15	14	14	14	14	15	16	16	16	15	14
1921	14	14	14	14	14	14	14	14	12	12	12	12
1922	12	12	12	12	12	12	12	12	12	12	12	12
1923	12½	13	13	13	13	13	14	14	14	14	14	14
1924	14	14	14	14	14	14	14	14	14	14	14	14
1925	14	14	14	14	14	14	14	14	14	14	14	14
1926	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14
New Orleans:												
1920	19	19	19	19	17	17	17	17	19	19	19	18
1921	17	17	16	16	16	16	16	16	16	16	14	14
1922	14	14	14	14	14	14	14	14	------	14	14	14
1923	14	------	14	14	14	14	14	14	14	15	15	------
1924	------	15	15	15	14	14	14	14	14	14	14	14
1925	14	14	14	14	12	12	12	12	12	14	14	14
1926	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14
San Francisco:												
1920	16	16	15½	15	16	16	15½	17	17	17	17	17
1921	15½	15½	15	15	15	14½	13½	14	14	13½	13½	13½
1922	13½	12½	12½	12½	------	12½	12½	12½	12½	12½	12½	13
1923	12½	12½	12½	12½	12½	12½	------	12½	------	------	14	14
1924	14	14	14	14	14	14	14	14	14	14	14	14
1925	14	14	14	14	14	14	14	14	14	14	14	14
1926	14	14	14	14	14	14	14	14	14	14	14	14
1927	14	14	14	14	14	14	14	14	14	14	14	14
1928	14	14	14	14	14	14	14	14	14	14	14	14
1929	14	14	14	14	14	14	14	14	14	14	14	14

Bureau of Agricultural Economics. Compiled from reports of the bureau secured through the cooperation of milk distributors, producers' associations, and municipal officers.

TABLE 453.—*Milk, standard or grade B: Retail price per quart, delivered to family trade in cities, 1929*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Boston	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½	15½
New York	16	16	16	16	16	16	16	16	16	16	16	16
Philadelphia	13	13	13	13	13	13	13	13	14	14	14	14
Pittsburgh	15	15	15	14	14	14	14	14	14	14	14	14
Cleveland	14	14	12	12	12	12	12½	13	13	13	11	11
Indianapolis	13	13	13	12	12	12½	12	12	12	12	12	12
Chicago	14	14	14	14	14	14	14	14	14	14	14	14
Detroit	14	------	14	14	14	------	14	14	14	14	14	14
Milwaukee	11	11	11	11	11	11	11	11	11	12	12	12
Minneapolis	12	12	12	12	12	12	12	12	12	12	12	12
St. Louis	13	13	13	13	13	13	13	13	13	13	13	13
Kansas City, Mo	13	13	14	14	14	14	13	14	13	14	13	13
Washington, D. C	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½	14½
Jacksonville	18½	18½	18½	18½	18½	19	18½	19	18½	18½	19	18½
Louisville	13	13	13	13	13	13	13	13	13	13	13	13
Birmingham	------	18	------	17	17	17	15	15	15	15	16	16
New Orleans	14	14	14	14	14	14	14	14	14	14	14	14
Dallas	13	13	13	13	13	13	13	13	13	13	13	13
Butte	13	------	13	13	------	13	13	13	------	13	13	13
Denver	12	12	12	12	12	12	12	12	12	12	12	12
Salt Lake City	------	------	10	10	------	------	------	10	10	10	10	10
Seattle	12	12	12	------	12	12	12	12	12	12½	13	13
Portland, Oreg	------	------	12	12	12	12	12	12	12	12	12	12
Los Angeles	15	15	15	15	15	15	15	15	15	15	15	------
San Francisco	14	14	14	14	14	14	14	14	14	14	14	14

Bureau of Agricultural Economics. Compiled from reports of the bureau secured through the cooperation of milk distributors, producers' associations, and municipal officers.

TABLE 454.—*Creamery butter production in factories in the United States, by States, 1919–1928*

State	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Me	1,141	727	719	596	402	568	479	547	517	348
N. H	397	300	305	309	424	271	137	90	72	44
Vt	10,677	13,253	14,919	12,289	11,935	12,294	9,372	8,305	6,732	5,469
Mass	2,849	3,198	3,895	2,999	1,844	1,790	2,026	2,150	2,514	2,340
R. I	65	58	77	76	76	105	68	75	100	66
Conn	930	877	1,165	986	753	820	675	617	550	401
N. England	16,059	18,413	21,080	17,255	15,434	15,848	12,757	11,784	10,485	8,668
N. Y	13,716	16,949	24,298	25,474	18,893	25,974	16,960	14,222	12,864	11,557
N. J	179	143	214	261	437	642	170	49	101	15
Pa	12,446	11,422	14,629	12,803	13,142	12,444	11,476	11,808	11,709	11,349
Middle Atlantic	26,341	28,514	39,141	38,538	32,472	39,060	28,606	26,079	24,674	22,921
Ohio	60,573	65,594	78,724	84,193	79,195	80,932	77,566	79,386	79,603	75,681
Ind	44,659	39,223	47,854	48,158	51,484	54,355	54,362	57,592	62,436	60,409
Ill	44,621	41,051	48,866	47,249	51,359	58,225	56,872	62,544	59,875	62,864
Mich	45,207	45,404	55,011	59,954	64,818	70,676	70,729	72,040	69,368	65,803
Wis	85,054	97,355	124,504	142,235	139,895	153,335	161,369	159,733	153,545	137,483
E. North Central	280,114	288,627	354,959	381,789	386,751	417,523	420,898	431,295	424,827	402,240
Minn	130,786	120,297	154,268	170,463	199,926	229,474	245,669	268,437	274,860	271,345
Iowa	87,915	84,290	106,516	129,778	141,407	159,378	156,361	168,827	177,224	196,068
Mo	38,411	35,228	42,422	46,565	51,818	56,801	55,953	66,861	62,549	69,201
N. Dak	14,697	13,419	16,177	21,675	23,355	28,515	31,500	34,898	32,462	30,889
S. Dak	17,479	14,071	18,886	21,146	27,447	24,643	29,193	29,814	32,843	34,853
Nebr	60,467	56,661	66,653	74,809	76,748	81,423	83,930	90,882	95,004	96,472
Kans	35,642	32,899	37,000	40,204	42,674	46,844	47,768	50,998	50,667	55,756
W. North Central	385,397	356,865	441,922	504,640	563,375	627,078	650,374	710,717	725,609	754,584
Del	253	350	395	203	154	150	80	67	50	47
Md	315	440	620	542	382	500	339	266	229	223
D. C	5	503	577	475	10		461	52		
Va	1,597	2,210	2,833	3,118	4,231	4,614	3,842	4,378	5,881	6,051
W. Va	328	867	530	420	276	466	533	487	287	325
N. C	829	832	1,263	1,549	1,718	1,683	1,556	1,680	2,032	1,849
S. C	27	16	19	165	537	527	429	364	432	392
Ga	6	7	85	979	1,868	1,826	1,836	1,982	3,044	2,224
Fla	17		11	81	99	20	22	105	129	153
S. Atlantic	3,377	5,225	6,333	7,532	9,275	9,786	9,098	9,381	12,084	11,264
Ky	5,321	7,875	10,746	12,010	12,244	12,942	14,087	16,975	19,364	19,822
Tenn	3,735	5,903	8,707	9,164	11,463	12,762	11,286	11,826	17,190	15,333
Ala	696	398	742	917	831	839	1,086	991	1,237	991
Miss	2,477	2,626	4,286	5,778	5,715	5,648	4,895	6,896	7,920	7,241
E. South Central	12,229	16,802	24,481	27,869	30,253	32,191	31,354	36,688	45,711	43,387
Ark	363	345	586	731	996	1,259	1,174	1,325	1,710	1,115
La	46	55	160	87	185	125	90	92	324	461
Okla	10,481	9,596	10,427	11,142	14,065	14,421	15,841	19,664	23,617	24,277
Tex	8,289	9,125	11,257	10,179	10,956	11,997	10,866	14,594	24,276	20,599
W. South Central	19,179	19,121	22,430	22,139	26,202	27,802	27,971	35,675	49,927	46,452
Wyo	1,140	875	1,277	1,403	1,894	1,941	1,999	2,289	2,009	1,831
Colo	13,144	12,979	15,290	16,410	18,625	18,130	18,794	18,255	20,871	21,614
N. Mex	6	6	29	129	185	251	326	455	447	421
Idaho	4,514	4,660	4,935	7,582	9,883	13,431	15,101	18,456	20,918	20,832
Ariz	1,000	828	1,358	623	600	2,107	1,034	1,489	2,150	2,246
Utah	3,796	3,567	4,549	5,913	7,500	8,585	7,034	8,037	9,909	9,549
Nev	1,726	2,018	2,388	2,642	2,361	2,640	2,593	2,432	2,187	2,211
Mont	5,389	5,168	7,439	7,713	10,667	13,874	13,968	15,549	16,759	16,364
Mountain	30,715	30,101	37,265	42,415	51,715	60,959	60,849	66,962	75,250	75,068
Wash	18,487	23,751	23,228	24,239	26,666	29,331	25,673	28,914	29,870	29,452
Oreg	14,432	14,288	15,289	17,158	18,128	20,993	21,575	22,570	22,831	20,963
Calif	61,795	61,870	68,810	69,941	81,943	75,509	72,371	71,701	75,227	72,050
Pacific	94,714	99,909	107,327	111,338	126,737	125,833	119,619	123,185	127,928	122,465
Total	868,125	863,577	1,054,938	1,153,515	1,242,214	1,356,080	1,361,526	1,451,766	1,496,495	1,487,049

Bureau of Agricultural Economics. The compilations are made from reports of factories to the bureau.

TABLE 455.—*Creamery butter: Receipts, gross weight, at five markets, specified years*

Market and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
New York—													
1927	17, 345	17, 878	20, 455	20, 528	26, 579	32, 262	28, 782	26, 606	20, 344	19, 013	16, 041	15, 489	261, 322
1928	18, 945	18, 474	20, 506	19, 264	22, 539	27, 412	26, 559	23, 722	21, 103	19, 702	17, 067	15, 300	250, 593
1929	19, 498	18, 873	20, 486	21, 895	26, 751	27, 936	29, 700	23, 854	20, 657	20, 083	17, 032	18, 095	265, 760
Chicago—													
1927	14, 885	14, 810	18, 412	21, 084	26, 918	32, 140	27, 780	22, 380	16, 037	14, 513	13, 004	13, 237	235, 200
1928	17, 052	15, 928	19, 232	17, 881	22, 649	29, 784	25, 654	21, 357	16, 418	15, 295	14, 036	15, 228	230, 514
1929	18, 158	16, 356	18, 758	19, 056	25, 935	30, 081	27, 119	22, 793	17, 130	16, 832	15, 766	16, 648	244, 632
Philadelphia—													
1927	6, 053	5, 763	6, 517	6, 487	8, 970	9, 936	8, 257	7, 595	5, 828	5, 325	5, 447	5, 549	81, 727
1928	6, 716	6, 343	6, 725	6, 429	7, 578	10, 077	8, 640	7, 735	6, 690	6, 404	5, 532	5, 626	84, 495
1929	6, 781	6, 158	7, 006	6, 745	8, 839	9, 491	8, 918	7, 570	6, 673	6, 309	6, 342	6, 554	87, 386
Boston—													
1927	4, 590	5, 366	6, 129	6, 558	10, 143	12, 245	11, 932	8, 847	5, 949	4, 636	3, 865	4, 357	84, 617
1928	5, 874	5, 619	5, 985	6, 768	8, 658	11, 454	12, 562	9, 389	6, 331	5, 501	4, 292	4, 891	87, 324
1929	6, 091	5, 259	5, 915	6, 656	9, 216	10, 787	11, 063	7, 812	5, 922	4, 652	4, 030	3, 780	81, 183
San Francisco—													
1927	1, 883	1, 685	2, 120	2, 641	2, 925	3, 190	2, 919	2, 627	1, 897	1, 938	1, 538	1, 346	26, 709
1928	1, 508	1, 433	1, 852	1, 816	2, 158	2, 591	2, 486	2, 328	1, 939	2, 005	1, 869	2, 047	24, 032
1929	1, 962	1, 911	1, 814	2, 529	3, 138	2, 885	2, 642	2, 074	1, 590	1, 470	1, 569	1, 571	25, 155
Total—													
1918	------	------	49, 308	45, 048	50, 851	83, 058	79, 149	60, 456	46, 708	51, 169	38, 277	35, 797	[1] 539, 821
1919	37, 867	34, 846	36, 592	41, 287	63, 669	84, 993	68, 926	55, 246	43, 282	35, 573	30, 731	25, 910	558, 922
1920	29, 827	29, 009	35, 314	28, 002	43, 571	66, 043	71, 167	53, 714	43, 551	33, 378	26, 917	26, 050	486, 543
1921	30, 779	28, 935	35, 154	39, 088	59, 563	78, 449	61, 464	62, 734	50, 216	45, 350	36, 421	37, 257	565, 410
1922	41, 775	39, 041	45, 101	40, 716	67, 063	92, 632	76, 918	60, 172	45, 577	40, 595	37, 372	38, 401	625, 363
1923	47, 843	39, 877	48, 955	47, 947	64, 328	89, 976	75, 336	56, 243	49, 307	45, 393	39, 759	41, 460	646, 424
1924	44, 476	47, 756	52, 328	51, 690	67, 572	91, 742	92, 036	67, 959	56, 247	49, 760	35, 868	39, 471	696, 905
1925	44, 825	41, 785	48, 351	50, 035	67, 454	88, 024	82, 918	68, 341	53, 303	51, 599	42, 099	42, 993	681, 727
1926	46, 809	46, 809	54, 646	53, 990	64, 653	89, 993	81, 053	59, 849	52, 985	45, 280	40, 588	42, 825	679, 480
1927	44, 756	45, 502	53, 633	57, 298	75, 536	89, 773	79, 670	68, 055	50, 055	45, 425	39, 895	39, 978	689, 575
1928	50, 095	47, 797	54, 300	52, 158	63, 582	81, 318	75, 901	64, 531	52, 481	48, 907	42, 796	43, 092	676, 958
1929	52, 490	48, 557	53, 979	56, 881	73, 879	81, 180	79, 442	64, 103	51, 972	50, 246	44, 739	46, 648	704, 116

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] 10-months' total, March to December, inclusive.

TABLE 456.—*Creamery butter: Production reported by factories, United States, 1917–1928*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1917	43, 997	38, 459	47, 371	53, 809	75, 108	98, 898	94, 151	83, 936	76, 744	56, 176	42, 705	48, 157	759, 511
1918	46, 432	44, 464	51, 161	59, 407	87, 639	106, 460	99, 515	87, 223	74, 462	65, 961	47, 816	47, 635	818, 175
1919	53, 604	45, 748	56, 227	68, 892	105, 346	120, 762	106, 156	86, 245	70, 508	60, 128	46, 446	48, 063	868, 125
1920	49, 044	46, 355	56, 303	60, 622	86, 845	114, 695	110, 844	90, 669	77, 106	65, 129	53, 570	52, 395	863, 577
1921	58, 906	56, 556	67, 677	82, 763	119, 077	130, 633	111, 898	111, 638	89, 932	84, 374	70, 024	71, 460	1, 054, 938
1922	73, 505	67, 405	79, 532	86, 623	132, 351	150, 034	135, 231	114, 160	92, 359	83, 070	68, 628	70, 617	1, 153, 515
1923	83, 688	74, 134	88, 311	100, 547	134, 350	158, 371	138, 278	120, 802	102, 273	89, 297	74, 909	77, 254	1, 242, 214
1924	87, 468	86, 731	95, 760	106, 012	139, 954	161, 992	164, 443	137, 836	115, 102	100, 536	77, 282	82, 964	1, 356, 080
1925	87, 121	80, 218	92, 302	107, 023	145, 478	164, 253	158, 920	136, 738	108, 325	104, 520	85, 492	91, 136	1, 361, 526
1926	97, 893	94, 222	112, 432	121, 049	155, 912	178, 276	159, 554	133, 294	116, 732	103, 068	88, 481	90, 853	1, 451, 766
1927	97, 965	95, 522	111, 451	126, 415	168, 808	188, 792	170, 484	146, 808	113, 546	102, 399	86, 058	88, 247	1, 496, 495
1928	110, 045	99, 394	111, 777	118, 849	156, 294	181, 037	167, 601	145, 430	110, 499	105, 894	87, 745	92, 484	1, 487, 049

Bureau of Agricultural Economics.

TABLE 457.—*Creamery butter:*[1] *Cold-storage holdings, United States, 1915–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1915	------	------	------	------	------	------		68, 578	101, 662	99, 450	92, 719	71, 849
1916	48, 977	31, 139	15, 033	3, 346	1, 082	7, 017	53, 863	102, 537	105, 836	100, 522	85, 260	67, 292
1917	46, 134	30, 474	16, 952	6, 805	3, 607	9, 953	49, 982	88, 992	108, 179	109, 154	100, 115	79, 928
1918	50, 726	26, 618	18, 808	14, 629	9, 536	12, 698	49, 140	88, 305	99, 334	87, 883	80, 874	65, 111
1919	43, 910	36, 777	24, 191	11, 909	9, 659	29, 435	90, 158	123, 546	131, 388	121, 816	100, 474	73, 654
1920	53, 737	38, 359	22, 568	12, 555	7, 554	12, 872	52, 526	101, 455	115, 558	113, 385	101, 778	79, 750
1921	58, 682	41, 486	27, 103	14, 732	7, 712	21, 682	61, 991	82, 838	92, 292	90, 116	77, 983	65, 129
1922	48, 412	35, 047	22, 582	9, 113	3, 830	13, 202	67, 410	103, 151	112, 039	96, 680	73, 857	47, 773
1923	26, 819	16, 122	8, 910	4, 824	3, 248	10, 112	62, 768	101, 774	102, 731	96, 117	76, 472	51, 508
1924	30, 299	15, 246	9, 847	7, 842	8, 913	22, 348	74, 184	134, 118	156, 440	153, 494	135, 018	100, 832
1925	65, 694	45, 748	28, 789	10, 875	3, 739	13, 036	63, 687	109, 075	128, 403	114, 172	94, 916	74, 754
1926	52, 785	39, 381	26, 313	17, 392	17, 527	30, 561	86, 897	131, 152	138, 151	125, 342	100, 871	64, 381
1927	34, 347	17, 952	7, 952	3, 044	3, 436	25, 404	89, 996	145, 147	163, 701	147, 396	118, 679	83, 224
1928	46, 289	28, 273	14, 404	5, 716	5, 109	15, 952	69, 750	120, 437	136, 175	128, 071	105, 811	70, 985
1929	43, 783	24, 747	11, 910	5, 532	5, 883	28, 369	91, 962	151, 621	168, 952	158, 541	138, 405	111, 650

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] Quantities given are net weights.

TABLE 458.—*Butter: Gross receipts by State of origin, 1923–1929*

NEW YORK

State of origin	1923	1924	1925	1926	1927	1928	1929												
							Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Minnesota	84, 944	74, 166	57, 206	57, 038	57, 081	44, 654	56, 333	3, 704	3, 982	4, 650	4, 907	5, 292	5 910	6. 603	4, 910	3, 975	4, 177	3, 817	4, 406
Iowa	48, 440	57, 781	56, 833	62, 093	66, 935	68, 676	78, 347	5, 352	4, 947	5, 455	6, 098	8, 070	9, 071	9, 686	7, 162	6, 602	6, 550	4, 582	4, 772
Illinois	33. 830	35, 039	39, 440	40, 037	37, 954	35, 816	35, 738	3, 289	2, 827	3, 180	2, 884	3, 104	3, 243	3, 208	3, 061	2, 580	2, 823	2, 472	3, 067
Nebraska	20. 359	24, 811	25. 088	27, 157	28, 457	28, 138	26, 803	1, 829	1, 772	2, 034	1, 867	2, 768	2, 944	3, 170	2, 779	2, 362	2, 236	1, 709	1, 333
Ohio	9, 834	7, 350	7, 121	6, 674	7, 565	7, 498	6, 217	432	467	287	390	597	509	811	764	672	531	384	373
Wisconsin	11, 771	13, 730	16, 903	17, 792	17, 615	15, 459	15, 839	1, 907	1, 588	1, 989	1, 877	1, 547	1, 281	1, 183	840	872	800	710	1, 245
New York	6, 130	8, 185	6, 974	6, 177	5, 385	5, 978	5, 097	135	350	235	244	736	447	585	483	436	528	482	436
Michigan	7, 075	11, 265	15, 498	13, 669	13, 566	15, 227	7, 555	856	949	695	816	536	698	701	484	488	378	387	567
Indiana	5, 222	3, 788	5, 958	5, 209	5, 417	5, 150	4, 890	288	178	79	211	465	866	826	479	429	559	307	203
Missouri	4, 649	3, 930	5. 396	6, 045	6, 540	6, 182	6, 573	403	567	418	464	906	649	595	551	654	691	458	217
Pennsylvania	1, 279	988	525	1, 176	1, 025	1, 074	1, 923	122	242	178	146	122	87	143	281	205	204	123	70
Tennessee	1, 132	859	1, 034	1, 881	2, 369	2, 305	2, 906	142	.46	79	210	393	206	380	322	258	417	250	203
California	288	87	102	1	161	218	1	1				(1)							
Kansas	1, 294	1, 064	847	2, 065	3, 808	4, 797	6, 520	243	523	643	856	674	598	589	468	473	313	524	616
Massachusetts	259	647	345	204	223	66	15	(1)	2	(1)	2	7	1	2	(1)		(1)	(1)	1
Virginia	417	684	432	417	473	535	467	38	19	17	15	62	72	85	45	18	25	15	56
South Dakota	260	270	279	1, 218	1, 129	1, 290	1, 503	89	61	24	150	214	137	190	180	84	118	131	125
Kentucky	517	954	463	710	978	884	617	82	1	33	32	3	126	87	66	21	94	70	2
North Dakota	134	397	193	109	573	2, 397	2, 052	85	58	24	96	204	340	268	382	171	99	157	168
Vermont	46		58	22	52	70	1			(1)		(1)	1		(1)	(1)	(1)	(1)	
Maryland	151	132	276	104	131	283	196	49	32	21	5	7	10	6	9	13	12	6	26
North Carolina	358	198	193	155	340	415	429	24	31	50	26	54	42	62	38	22	24	39	17
Georgia	98	97	178	52	38	86	39	2	2	6	1	(1)	(1)	(1)	(1)	23	2	(1)	3
Alabama	234	70	138	171	220	370	154	27	12	8	14	22	10	10	11	17	7	5	11
Washington	194		27	224	310	26	27								27				
New Jersey	129		22	466	256	93	123	(1)	(1)	1	89	(1)	(1)	(1)	32	(1)	(1)	(1)	1
Mississippi	142		203	663	1, 251	812	1, 070	39	29	36	55	245	162	133	120	25	56	121	49
Oklahoma	261		327	535	363	502	1, 202	42	40	50	167	318	261	182	87	30	81	23	21
Montana		465	37	19	288	296	278	50	48	143	37								
Other States	686	852	181	513	730	1, 222	2, 743	268	100	151	236	405	265	195	273	227	258	258	107
Canada	3, 631	950	1, 850	146	89	74	2						(1)					2	
Total	243, 764	248, 759	244, 127	252, 742	261, 322	250, 593	265, 760	19, 498	18, 873	20, 486	21, 895	26, 751	27, 936	29, 700	23, 854	20, 657	20, 983	17, 032	18, 095

CHICAGO

Wisconsin	70, 588	79, 928	75, 941	72, 200	64, 611	58, 108	65, 356	3, 895	3, 972	4, 539	5, 092	7, 206	8, 705	8, 138	6, 563	4, 811	4, 559	3, 803	4, 073
Minnesota	39, 611	46, 767	54, 859	43, 569	48, 057	50, 230	54, 043	5, 862	4, 321	4, 907	5, 059	4, 819	5, 748	5, 049	4, 276	3, 492	3, 565	3, 239	3, 706
Iowa	42, 108	46, 896	46, 150	41, 092	39, 347	39, 948	44, 152	2, 677	2, 735	3, 220	3, 004	5, 230	6, 057	5, 223	4, 585	3, 523	2, 867	2, 517	2, 514
Nebraska	17, 433	20, 054	19, 361	22, 505	17, 090	19, 498	17, 450	1, 455	1, 405	1, 564	1, 562	1, 942	2, 201	1, 756	1, 309	766	975	1, 373	1, 142
South Dakota	14, 249	15, 971	18, 151	16, 402	16, 513	18, 270	16, 187	1, 494	1, 415	1, 669	1, 527	1, 470	1, 856	1, 672	1, 252	1, 144	1, 030	800	858
Kansas	10, 300	11, 098	7, 864	8, 036	9, 989	12, 981	11, 185	734	695	740	867	1, 154	1, 242	1, 224	1, 177	758	727	1, 036	831
Illinois	7, 392	8, 870	5, 819	6, 632	8, 057	6, 371	8, 406	158	75	164	193	984	1, 155	1, 552	1, 098	755	615	797	860
Missouri	11, 188	11, 975	9, 678	10, 411	13, 484	11, 508	13, 020	1, 065	833	542	691	1, 610	1, 408	1, 156	1, 092	902	1, 083	1, 100	1, 538
North Dakota	3, 418	6, 301	8, 511	6, 114	4, 181	2, 919	3, 287	184	254	679	325	189	414	359	199	166	308	159	51
Oklahoma	1, 894	2, 144	2, 735	4, 392	4, 510	2, 329	3, 175	210	190	157	166	427	210	246	362	345	348	268	246
Colorado	1, 239	1, 829	430	828	678	1, 315	977	33	97	117	82	116	130	183	127	44	30	7	11
Ohio	425	360	619	417	194	128	78	6	13	6	1	1	5	4	3	5	11	7	16
Michigan	1, 966	1, 761	1, 474	1, 297	1, 024	923	854	27	65	190	91	118	136	82	39	16	33	10	47
Indiana	1, 109	1, 102	805	867	749	943	1, 098	108	100	54	65	138	107	77	87	83	84	109	86
Kentucky	871	560	539	957	1, 888	1, 894	2, 067	110	100	72	50	130	129	124	126	110	329	388	399
Texas	216	102	78	212	3, 680	2, 322	2, 325	96	35	32	160	316	440	132	385	205	219	122	183
Montana	643	1, 077	343	107	194	165	235	---	27	76	90	30	---	5	4	1	2	---	---
Tennessee	112	35	137	126	438	113	166	17	3	5	10	4	5	44	32	2	4	26	14
Mississippi	144	198	66	44	31	49	239	18	(1)	2	4	1	71	53	69	---	21	---	---
California	319	77	---	(1)	76	26	---	---	---	---	---	---	---	---	---	---	---	---	---
Pennsylvania	36	103	55	43	2	15	56	1	---	(1)	---	---	---	---	(1)	---	(1)	---	55
Idaho	233	202	---	64	---	7	8	---	8	---	---	---	---	---	---	---	---	---	---
New York	25	153	69	35	31	275	35	---	5	10	---	---	2	2	---	1	---	1	14
Other States	158	520	154	196	376	177	233	8	8	13	17	50	60	38	8	1	22	4	4
Total [2]	225, 892	258, 083	254, 308	236, 546	235, 200	230, 514	244, 632	18, 158	16, 356	18, 758	19, 056	25, 935	30, 081	27, 119	22, 793	17, 130	16, 832	15, 766	16, 648

[1] Not over 500 pounds.

[2] Totals include receipts from Canada as follows: Chicago, 215 in 1923 and 470 in 1925 Philadelphia, 252 in 1923, 391 in 1924, 173 in 1925; Boston, 137 in 1923, 29 in 1924, 1 in 1926, 5 in 1927, 2 in 1928; San Francisco, 316 in 1923, 326 in 1925.

TABLE 458.—*Butter: Gross receipts by State of origin, 1923–1929*—Continued

PHILADELPHIA

State of origin	1923	1924	1925	1926	1927	1928	1929 Total	1929 Jan.	1929 Feb.	1929 Mar.	1929 Apr.	1929 May	1929 June	1929 July	1929 Aug.	1929 Sept.	1929 Oct.	1929 Nov.	1929 Dec.
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Minnesota	27,194	34,753	32,168	40,986	45,478	54,427	54,499	4,564	3,798	4,761	4,184	5,797	5,875	5,495	4,742	3,997	3,803	3,617	3,866
Illinois	11,753	10,874	11,156	7,766	4,807	3,811	4,023	286	163	94	213	243	369	391	427	355	236	750	496
Ohio	2,699	3,437	3,224	3,505	3,162	2,665	1,934	192	166	122	145	182	237	161	161	157	124	147	140
Pennsylvania	2,571	2,297	1,735	1,268	1,097	731	612	57	35	48	42	67	94	78	49	35	42	39	26
Indiana	3,757	2,392	1,688	1,848	1,736	1,502	1,523	88	113	81	114	153	63	163	116	204	120	169	139
Wisconsin	4,119	4,616	2,963	4,305	6,313	3,307	4,585	325	875	540	590	195	473	383	208	270	124	126	476
Michigan	1,812	3,446	6,415	3,418	1,835	1,356	568	79	22	134	69	43	50	42	5	-	-	2	122
New York	5,673	1,926	2,221	1,262	596	690	529	18	25	-	-	(1)	43	21	58	45	131	152	36
Iowa	1,314	2,783	2,313	4,288	5,237	4,808	6,446	490	314	426	397	633	778	657	535	491	549	534	642
Missouri	942	1,677	637	1,490	1,444	1,921	2,385	181	153	189	288	357	254	284	153	134	127	133	132
Tennessee	915	1,979	722	1,101	1,969	1,742	2,360	110	42	46	129	387	394	321	260	216	243	141	71
Virginia	1,247	1,638	1,196	1,027	935	881	1,289	21	35	14	18	81	218	245	206	224	148	65	14
California	59	224	24	287	243	35	-	-	-	-	-	-	-	-	-	-	-	-	-
New Jersey	285	19	245	44	38	4	-	-	-	-	-	-	-	-	-	-	-	-	-
North Dakota	42	44	-	40	76	101	27	-	21	-	6	-	-	-	-	-	-	-	-
Delaware	71	21	189	1	6	1	9	-	-	(1)	8	(1)	-	-	1	-	(1)	-	-
Nebraska	1,757	2,409	3,510	4,957	4,341	4,271	5,038	330	342	439	468	480	470	474	511	347	439	387	351
Maryland	1,057	137	138	242	205	98	85	24	2	-	5	35	4	1	6	4	2	1	1
South Dakota	11	110	76	158	263	418	582	7	51	47	57	55	71	91	53	69	61	5	15
Kentucky	119	187	57	221	313	212	130	5	-	-	-	32	-	-	1	23	43	26	-
Kansas	223	320	628	127	370	384	135	-	-	43	6	18	-	22	-	21	23	1	1
North Carolina	14	7	26	87	33	5	96	-	-	1	6	16	14	12	22	8	12	4	1
West Virginia	160	145	146	197	277	225	53	3	-	-	(1)	19	8	4	7	4	6	1	1
Mississippi	401	311	115	276	493	695	214	-	-	-	-	40	43	45	38	21	27	-	-
Other States	151	588	299	444	460	205	264	1	1	21	(1)	6	33	28	11	48	49	42	24
Total [2]	68,598	76,731	72,064	79,345	81,727	84,495	87,386	6,781	6,158	7,006	6,745	8,839	9,491	8,918	7,570	6,673	6,309	6,342	6,554

BOSTON

Illinois	33,517	25,384	13,555	11,766	13,557	12,251	11,893	1,098	939	763	1,065	1,475	1,726	1,721	899	522	520	570	595
Minnesota	15,880	22,744	26,975	30,948	30,830	33,652	28,908	1,962	1,687	2,379	2,658	2,925	3,463	3,998	2,974	2,222	1,689	1,556	1,395
Vermont	5,854	5,923	4,071	3,075	2,318	1,974	781	97	94	95	135	115	86	50	45	22	18	19	5
New York	5,578	5,468	5,769	3,327	2,607	1,626	1,380	164	62	72	152	69	93	73	262	159	147	71	56
Iowa	3,023	3,361	4,360	1,616	3,969	4,261	4,257	168	148	126	285	511	594	653	407	482	462	199	222
Ohio	3,064	3,282	2,661	2,046	2,751	2,879	3,214	211	157	128	159	390	615	427	257	182	227	210	251
Indiana	2,722	2,436	1,434	1,122	1,576	1,808	3,495	344	137	80	99	242	680	532	330	317	234	257	243
Nebraska	3,274	6,378	8,086	8,860	10,335	12,159	12,315	1,012	846	1,083	1,068	1,540	1,501	1,363	1,187	885	657	613	560
Michigan	1,555	2,394	1,867	1,928	1,675	1,787	703	8	4	36	5	65	146	154	69	16	68	33	99
South Dakota	1,891	2,450	3,070	3,609	3,526	2,985	2,851	102	93	160	75	294	443	657	530	371	101	22	3
Missouri	646	1,404	3,170	2,940	3,151	3,989	3,221	349	284	216	137	311	434	476	213	269	157	193	182
Wisconsin	1,813	1,983	2,463	3,101	2,238	2,057	1,679	66	37	91	48	310	388	306	105	142	80	70	36
Massachusetts	702	723	989	735	346	168	15	2	8	(1)	2	(1)	1	1	(1)	------	1	------	------
New Hampshire	263	143	19	22	94	14	3	1	(1)	(1)	1	(1)	(1)	(1)	(1)	1	(1)	(1)	(1)
Pennsylvania	188	26	143	119	240	95	192	------	93	1	------	------	42	15	------	------	20	21	------
Kentucky	72	91	46	30	228	298	580	21	------	------	------	135	64	44	156	45	42	43	30
Kansas	402	507	1,048	1,705	1,532	1,801	1,268	113	115	91	224	168	165	104	104	60	63	------	61
Maine	87	196	192	116	167	86	17	(1)	(1)	1	1	2	6	1	1	1	3	(1)	1
Oklahoma	166	288	151	463	664	575	825	45	46	22	90	143	122	163	36	53	31	50	24
North Dakota	1,545	1,230	2,167	2,479	1,871	1,227	2,247	241	399	390	314	183	128	120	174	87	132	62	17
Montana	49	220	39	24	183	14	29	------	------	29	------	------	------	------	------	------	------	------	------
Other States	231	261	201	211	754	1,616	1,310	87	110	152	138	338	90	205	63	86	------	41	------
Total [2]	82,659	86,921	82,476	83,243	84,617	87,324	81,183	6,091	5,259	5,915	6,656	9,216	10,787	11,063	7,812	5,922	4,652	4,030	3,780

SAN FRANCISCO

California	21,805	22,984	21,587	20,701	18,976	17,732	19,070	1,466	1,328	1,572	2,301	2,663	2,241	1,892	1,400	1,105	1,020	1,115	967
Oregon	1,177	948	1,195	2,306	2,253	1,796	2,748	224	226	170	175	360	397	389	259	138	152	130	128
Washington	682	606	469	327	300	182	231	------	136	1	------	------	------	55	------	9	3	4	23
Nevada	293	258	252	63	113	74	41	1	(1)	------	------	1	2	11	6	7	4	------	9
Idaho	502	490	1,043	1,191	1,722	1,255	1,361	95	104	60	46	91	73	119	91	130	129	153	270
Montana	361	700	1,895	2,331	2,173	2,150	1,222	151	90	------	------	16	102	146	240	138	118	137	84
Utah	179	158	98	95	223	384	134	24	18	11	7	7	21	5	------	9	19	5	8
Illinois	------	1	204	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Colorado	30	21	545	192	406	260	159	1	1	------	(1)	------	------	------	49	24	------	25	59
Nebraska	25	47	349	55	77	33	81	------	7	------	------	------	49	------	------	------	25	------	------
Minnesota	------	172	268	339	441	165	------	------	------	------	------	------	------	------	------	------	------	------	------
Iowa	24	------	237	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Other States	117	26	284	4	25	1	108	------	1	------	------	------	------	25	29	30	------	------	23
Total [2]	25,511	26,411	28,752	27,604	26,709	24,032	25,155	1,962	1,911	1,814	2,529	3,138	2,885	2,642	2,074	1,590	1,470	1,569	1,571

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Not over 500 pounds.

[2] Totals include receipts from Canada as follows: Chicago, 215 in 1923 and 470 in 1925; Philadelphia, 252 in 1923, 391 in 1924, 173 in 1925; Boston, 137 in 1923, 29 in 1924, 1 in 1926, 5 in 1927, 2 in 1928; San Francisco, 316 in 1923, 326 in 1925.

TABLE 459.—*Butter: International trade, average 1909-1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Denmark	6, 241	195, 530	1, 744	270, 674	2, 816	292, 115	1, 826	315, 721	1, 621	325, 710
New Zealand	47	38, 761	13	139, 476	16	130, 820	0	163, 020	0	162, 352
Australia	46	77, 859	[1] 13	128, 494	[1] 3, 726	83, 016	[1] 10,935	75, 089	---------	112, 827
Netherlands	4, 987	75, 133	5, 757	87, 598	3, 347	100, 428	4, 042	105, 714	5, 123	103, 485
Argentina	113	6, 934	6	59, 282	15	64, 234	3	46, 808	---------	44, 182
Irish Free State	0	0	9, 381	44, 975	6, 501	56, 099	4, 836	65, 576	5, 879	62, 623
Russia	2. 202	150, 294	[1] 191	[1] 55,527	[1] 263	[1] 59,410	[1] 428	[1] 71, 747	---------	71, 689
Finland	2, 370	26, 337	4	29, 081	196	29, 127	2	33, 238	---------	29, 488
Canada	3, 388	3, 973	100	26, 647	9, 152	9, 814	11, 209	2, 696	16, 802	1, 995
Sweden	330	45, 870	406	20, 333	79	33, 353	63	40, 707	93	38, 679
Latvia	0	0	[1] 10	15, 772	[1] 32	22, 343	[1] 28	23, 724	---------	28, 673
Estonia	0	0	0	14, 208	0	19, 161	0	21, 839	0	---------
Italy	972	7, 870	259	8, 009	153	5, 679	2, 085	2, 805	3, 565	1, 779
Spain	939	259	295	583	309	408	[1] 337	[1] 303	---------	---------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	455, 489	1, 179	616, 300	1, 445	626, 325	1, 688	625, 144	1, 703	667, 110	1, 395
Germany	111, 441	498	212, 993	304	215, 584	264	238, 683	190	279, 000	281
France	13, 713	40, 769	6, 655	8, 211	1, 499	11, 040	12, 063	23, 555	5, 808	24, 836
Belgium	14, 024	3, 125	9, 191	871	5, 013	1, 899	2, 559	2, 957	2, 898	3, 671
Switzerland	11, 106	44	19, 092	177	17, 818	131	18, 727	159	18, 061	150
United States	1, 647	4, 125	7, 212	5, 343	8, 029	5, 483	8, 460	4, 343	4, 659	3, 898
Dutch East Indies	4, 152	0	7, 321	0	10, 115	0	9, 170	0	[2] 8, 231	0
Greece	206	8	[1] 914	0	1, 009	0	1, 625	0	1, 172	0
Czechoslovakia	0	0	1, 203	310	1, 160	334	1, 683	369	992	1, 295
Norway	976	3, 137	1, 467	468	2, 369	338	2, 511	25	1, 533	82
Austria	[3] 6, 281	[3] 4, 267	2, 856	[1] 334	4, 648	583	4, 230	440	1, 785	1, 094
Cuba	1, 459	0	2, 655	0	2, 169	0	1, 878	0	---------	0
Egypt	2, 350	[4] 166	2, 384	56	2, 839	44	2, 552	87	1, 775	40
China	[5] 1, 677	0	1, 697	0	1, 762	0	1, 530	0	1, 945	0
Peru	462	20	1, 653	9	1, 844	6	1, 441	9	2, 116	2
Algeria	1, 946	9	1, 830	32	1, 507	53	[1] 2, 124	[1] 48	---------	---------
Philippine Islands	1, 665	0	991	0	1, 188	0	1, 072	0	1, 412	0
Trinidad and Tobago	847	0	918	0	1, 038	0	1, 344	0	---------	---------
Union of South Africa	3, 913	26	705	793	48	262	1, 244	242	693	224
Total 33 countries	654, 989	686, 193	916, 216	919, 012	932, 569	928, 132	973, 834	1, 003, 114	1, 032, 273	1, 020, 450

Bureau of Agricultural Economics. Official sources, except where otherwise noted. Butter includes all butter made fron milk, melted and renovated butter, but does not include margarine, cocoa butter, or ghee.

[1] International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] Average for Austria-Hungary.
[4] 2-year average.
[5] 4-year average.

TABLE 460.—*Butterfat: Estimated average, price per pound received by producers in the United States, 1921–1929*

Year beginning May—	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	Weighted average
	Cts.	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*	*Cts.*
1921	29. 7	27. 6	31. 6	36. 8	36. 2	40. 0	40. 6	39. 9	33. 4	34. 0	34. 5	33. 4	34. 0
1922	33. 4	33. 9	34. 8	32. 8	35. 5	39. 2	44. 2	50. 3	47. 0	44. 9	44. 9	46. 0	39. 3
1923	40. 3	36. 9	36. 7	38. 7	42. 2	44. 1	47. 8	49. 2	50. 6	48. 5	46. 4	40. 8	42. 4
1924	37. 6	37. 1	37. 8	35. 8	36. 6	36. 6	37. 0	41. 1	40. 6	37. 9	41. 5	40. 5	38. 1
1925	40. 3	39. 9	40. 5	41. 3	42. 6	47. 1	47. 8	47. 6	45. 2	43. 1	42. 9	40. 4	42. 6
1926	39. 1	39. 3	38. 6	38. 6	40. 5	42. 4	44. 8	47. 9	46. 9	46. 8	48. 0	47. 1	42. 5
1927	43. 6	40. 8	40. 3	39. 4	41. 6	44. 4	45. 8	47. 8	48. 5	46. 0	46. 5	45. 4	43. 6
1928	44. 4	43. 5	43. 3	44. 3	46. 5	47. 0	47. 6	49. 2	47. 6	47. 8	48. 3	46. 5	45. 8
1929	45. 4	43. 6	43. 4	43. 3	44. 6	45. 6	43. 5	41. 9	------	------	------	------	---------

Bureau of Agricultural Economics. Quotations cover butterfat for all uses. Based on reports of special price reporters. Monthly prices weighted by number of milk cows Jan. 1, by States; yearly price obtained by weighting monthly prices by production of creamery butter.

TABLE 461.—*Butter, 92-score creamery: Average wholesale price, at leading markets, specified years*

NEW YORK

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	33	30	33	31	28	28	28	29	30	30	31	30	30
1911	26	26	24	21	22	23	25	26	27	30	34	37	27
1912	39	32	31	33	30	27	27	27	30	31	34	37	32
1913	35	36	37	35	29	28	27	28	32	31	34	36	32
1914	33	29	28	25	26	27	28	30	31	32	35	34	30
1915	34	32	30	31	29	28	27	26	27	29	31	35	30
1916	33	34	37	36	31	30	29	31	34	35	39	40	34
1917	40	44	42	44	40	39	39	41	44	45	46	50	43
1918	52	50	44	42	42	44	45	46	56	58	63	69	51
1919	62	52	62	64	58	52	53	55	59	68	71	72	61
1920	65	66	67	71	61	57	57	55	59	60	63	55	61
1921	52	47	48	46	32	33	40	43	43	47	45	44	43
1922	37	37	38	38	38	37	36	35	41	46	51	54	41
1923	52	50	49	46	42	39	39	44	46	48	53	55	47
1924	53	50	47	38	39	41	40	38	38	39	43	45	43
1925	40	41	48	45	43	42	43	43	48	51	51	49	45
1926	45	45	43	39	41	41	40	42	45	47	51	55	44
1927	49	52	50	50	43	43	42	42	46	48	50	52	47
1928	49	47	49	45	45	44	45	47	49	48	51	50	47
1929	48	50	48	45	44	44	42	43	46	46	43	41	45

CHICAGO

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1927	48	50	49	48	41	40	40	41	45	46	48	51	46
1928	47	46	48	44	43	43	44	46	47	46	49	49	46
1929	47	49	48	44	42	42	41	42	45	44	41	39	44

SAN FRANCISCO

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1927	47	48	45	42	41	42	42	44	47	48	49	48	45
1928	46	45	43	40	42	43	46	48	50	51	49	50	46
1929	46	47	45	43	45	45	45	46	49	48	48	42	46

PHILADELPHIA

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1927	50	52	51	51	44	43	43	43	47	49	51	53	48
1928	50	48	50	46	46	45	46	48	50	49	52	51	48
1929	49	51	49	46	45	45	43	44	47	47	44	42	46

BOSTON

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1927	50	52	51	51	44	43	42	42	46	48	48	50	47
1928	49	47	50	46	45	44	45	47	49	48	50	50	48
1929	48	50	49	46	44	44	43	44	46	46	43	41	45

Bureau of Agricultural Economics. Compiled from Urner-Barry reports, 1910-1917 (New York), average of daily range; subsequently from reports of bureau representatives in the markets. Earlier data available in 1925 Yearbook, p. 1094, Table 501, and 1927 Yearbook, p. 1082.

TABLE 462.—*Butter: Average export price per pound in Copenhagen, Denmark, 1914–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1914	26.1	25.6	25.6	24.1	23.4	23.9	25.9	24.4	25.0	27.8	27.3	29.9	25.8
1915	29.6	26.9	28.0	27.6	29.6	29.1	31.0	32.6	34.7	41.6	40.5	36.6	32.3
1916	33.8	35.4	37.8	36.8	36.3	35.7	36.7	40.1	42.1	42.6	44.3	44.9	38.9
1917	45.3	39.6	38.4	37.2	38.6	40.5	45.0	49.7	54.6	65.4	68.4	65.5	49.0
1918	61.2	63.7	64.0	65.0	65.3	64.7	65.1	65.0	62.0	58.3	75.6	76.0	65.7
1919	75.8	73.8	72.4	71.1	58.2	50.8	48.4	46.5	54.7	53.8	59.5	52.1	59.8
1920	48.9	42.1	49.2	49.8	44.2	44.8	42.4	42.9	43.6	45.7	44.7	44.0	45.2
1921	42.4	39.3	40.4	43.9	33.5	32.4	38.3	41.1	36.4	38.3	39.9	31.8	38.1
1922	31.1	31.0	32.9	83.8	33.5	37.0	39.4	39.1	41.1	40.7	39.9	39.7	36.6
1923	40.5	41.3	41.0	34.5	29.5	29.3	30.7	34.7	40.3	38.9	39.4	41.4	36.8
1924	40.0	39.5	36.9	31.3	36.4	33.4	37.8	41.1	42.3	46.1	44.2	46.8	39.6
1925	42.0	45.4	46.1	40.6	36.9	39.4	40.5	44.2	45.7	46.5	44.6	37.8	42.5
1926	36.5	40.2	38.8	36.2	34.8	35.7	35.4	36.1	36.6	36.3	34.9	37.1	36.6
1927	36.4	39.3	36.8	35.2	32.9	33.2	32.2	35.0	39.6	39.4	41.2	38.0	36.6
1928	35.4	37.5	40.0	36.8	35.4	34.9	36.4	38.0	40.2	39.5	40.6	42.4	38.1
1929	39.1	39.0	35.5	32.8	33.4	35.1	35.3	35.6	39.7	40.5	38.7	35.8	36.7

Bureau of Agricultural Economics. Danish Butter Journal (Smor Tidende) official quotations. For earlier years, 1882–1913, see the United States Department of Agriculture Yearbook, 1923, p. 923.

Conversion from Danish quotations in ore per pound (1.1023 pounds) at par of exchange (100 ore=26.8 cents) to July, 1914; beginning July, 1914, to December, 1926, inclusive, from weekly quotations in kroner per 100 kg., at average monthly exchange rate as quoted by Federal Reserve Board. Beginning January, 1927, to date at par of exchange.

TABLE 463.—*Cheese, whole milk American Cheddar: Production in the United States, 1917–1928*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1917	8,519	9,415	11,918	17,577	28,932	38,796	35,296	32,248	37,613	22,303	14,262	8,070	264,949
1918	8,143	7,860	11,992	17,931	31,285	40,184	34,332	29,996	25,424	18,862	12,172	9,097	247,278
1919	12,065	12,964	20,118	22,751	35,958	45,708	36,574	32,049	27,366	24,223	14,216	11,152	295,144
1920	10,457	11,509	14,954	18,856	29,832	41,376	34,313	26,787	22,935	20,054	13,308	10,303	254,684
1921	11,889	12,857	17,678	23,521	34,556	36,444	26,977	27,652	23,612	21,496	13,426	11,618	261,726
1922	12,837	13,927	18,774	21,740	31,349	36,254	33,265	29,496	25,581	25,785	18,382	15,416	282,806
1923	15,092	15,326	20,184	24,014	32,942	41,382	38,288	31,822	28,648	25,566	18,236	16,608	308,108
1924	17,718	18,886	22,955	24,597	33,657	43,517	40,716	33,602	30,539	26,210	17,252	15,046	324,695
1925	16,834	17,991	21,598	26,889	38,012	45,782	43,706	37,659	31,548	28,253	20,349	18,619	347,240
1926	19,519	19,984	25,216	29,221	38,598	46,320	40,164	33,239	28,809	23,164	16,386	15,295	335,915
1927	16,660	17,085	21,318	24,533	34,704	41,489	38,195	31,944	25,783	23,012	16,717	16,337	307,777
1928	18,010	19,005	23,451	28,221	37,324	45,012	40,072	34,229	30,342	25,134	18,013	16,440	335,253

Bureau of Agricultural Economics.

TABLE 464.—*Cheese, whole-milk American Cheddar: Production, United States, by States, 1919–1928*

State	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Vermont	2,960	1,382	1,380	954	1,200	1,755	1,120	1,114	629	603
Other New England States	12	3	79			34	6	128	96	147
New England	2,972	1,385	1,459	954	1,200	1,789	1,126	1,242	725	750
New York	46,510	30,829	37,970	47,726	37,448	36,608	38,401	31,663	24,931	31,075
New Jersey	446	130		634	196	155				
Pennsylvania	2,928	2,673	3,208	2,209	2,497	1,750	1,349	1,681	1,750	2,196
Middle Atlantic	49,884	33,632	41,178	50,569	40,141	38,513	39,750	33,344	26,681	33,271
Ohio	963	659	654	195	128	366	253	269	303	936
Indiana	70	42	117	62	78	306	198	234	701	4,969
Illinois	2,538	999	1,751	2,401	2,875	2,498	2,444	2,902	2,836	4,115
Michigan	5,188	4,032	5,064	3,657	4,342	5,867	5,844	6,827	5,906	7,724
Wisconsin	201,836	188,548	182,777	193,376	226,916	235,186	258,684	248,059	227,447	221,775
East North Central	210,595	194,280	190,363	199,691	234,339	244,223	267,423	258,291	237,193	239,519
Minnesota	8,998	5,502	5,693	5,291	7,229	9,790	8,419	8,984	7,556	9,163
Iowa	859	545	313	344	361	530	501	383	410	661
Missouri	302	380	382	96	224	105	252	312	484	2,377
Others	97	31	141	190	186	354	477	912	1,301	4,973
West North Central	10,256	6,458	6,529	5,921	8,000	10,779	9,649	10,591	9,751	17,174
South Atlantic	387	220	184	226	277	276	155	110	164	754
Tennessee	51	26	50	71	284	398	321	172	154	650
Others			29		51		37		15	3,605
East South Central	51	26	79	71	335	398	358	172	169	4,255
West South Central	3		15	51		37		5		1,433
Wyoming	1,612	1,180	1,543	3,416	1,791	1,883	1,923	2,118	2,067	2,185
Idaho	2,578	1,722	2,117	3,368	5,311	7,343	7,320	7,986	7,434	7,718
Utah	907	849	1,027	3,219	2,139	2,162	1,753	1,809	2,205	2,592
Montana	269	233	113	259	641	792	1,296	1,484	1,435	2,347
Others	476	231	529	187	318	701	482	650	1,390	3,101
Mountain	5,842	4,215	5,329	10,449	10,200	12,881	12,774	14,047	14,531	17,943
Washington	1,145	1,143	1,910	2,928	2,762	2,998	3,076	3,130	2,924	4,051
Oregon	8,348	8,282	8,777	8,720	7,678	9,951	9,903	11,517	11,435	11,051
California	5,661	5,043	5,904	3,226	3,082	2,850	3,026	3,466	4,204	5,052
Pacific	15,154	14,468	16,591	14,874	13,522	15,799	16,005	18,113	18,563	20,154
Total	295,144	254,684	261,727	282,806	308,014	324,695	347,240	335,915	307,777	335,253

Bureau of Agricultural Economics. The compilations are made from reports of factories to the bureau.

TABLE 465.—*Cheese: Receipts, gross weight, at five markets, specified years*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
						NEW YORK							
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1927	2, 847	2, 844	3, 284	3, 505	3, 502	4, 814	5, 228	4, 824	5, 108	4, 398	3, 367	3, 216	46, 937
1928	3, 695	3, 403	3, 944	4, 017	4, 158	4, 865	4, 495	4, 326	4, 085	4, 476	3, 408	3, 400	48, 272
1929	3, 725	3, 854	4, 066	3, 095	4, 576	5, 218	5, 588	5, 074	4, 534	3, 858	3, 502	3, 821	50, 911
						CHICAGO							
1927	7, 170	9, 104	9, 145	10, 210	13, 263	11, 940	13, 139	12, 557	11, 915	9, 918	7, 487	7, 785	123, 633
1928	7, 713	7, 184	7, 401	7, 615	7, 626	9, 152	10, 792	9, 450	9, 108	8, 639	6, 930	5, 654	97, 264
1929	7, 262	7, 134	5, 511	5, 619	7, 972	8, 257	9, 048	8, 542	6, 641	6, 053	4, 585	4, 199	80, 823
						PHILADELPHIA							
1927	1, 140	1, 409	1, 047	1, 290	2, 041	2, 357	2, 409	1, 899	2, 027	2, 183	1, 362	1, 232	20, 396
1928	1, 295	1, 261	1, 343	1, 312	1, 796	2, 092	2, 821	1, 752	2, 096	2, 405	1, 693	1, 173	21, 039
1929	1, 220	1, 198	1, 190	1, 602	1, 957	1, 616	2, 265	1, 786	2, 023	2, 105	1, 840	1, 171	19, 973
						BOSTON							
1927	834	857	694	796	1, 211	1, 654	1, 736	1, 919	1, 347	1, 466	1, 162	912	14, 588
1928	898	1, 031	991	1, 113	1, 587	1, 884	1, 950	2, 048	1, 607	2, 154	1, 281	818	17, 362
1929	639	978	709	997	1, 232	1, 978	2, 363	1, 837	1, 108	1, 222	917	919	14, 899
						SAN FRANCISCO							
1927	716	702	786	1, 121	1, 284	1, 369	1, 622	1, 357	1, 125	1, 031	900	681	12, 694
1928	808	836	975	1, 082	1, 086	1, 223	1, 683	1, 152	1, 326	991	867	647	12, 676
1929	935	713	785	1, 018	1, 013	1, 337	1, 284	1, 366	983	1, 105	985	769	12, 293
						TOTAL							
1918	-------	-------	-------	-------	-------	-------	20, 536	16, 112	12, 383	13, 796	10, 398	11, 292	-------
1919	10, 988	10, 271	13, 386	15, 362	20, 069	22, 648	22, 267	18, 417	18, 519	18, 491	14, 650	12, 199	197, 267
1920	11, 094	9, 655	13, 918	8, 583	16, 140	21, 874	19, 797	16, 416	12, 831	12, 924	13, 802	11, 633	168, 667
1921	11, 488	11, 283	12, 758	13, 952	19, 361	21, 680	19, 324	15, 999	14, 923	16, 653	13, 228	10, 973	181, 622
1922	10, 734	11, 258	14, 789	15, 565	19, 146	22, 770	20, 211	19, 806	17, 463	18, 323	15, 699	14, 071	199, 835
1923	13, 063	12, 617	15, 354	16, 433	18, 963	25, 406	25, 764	21, 680	18, 619	21, 325	16, 557	13, 256	219, 037
1924	13, 899	16, 092	16, 540	16, 175	19, 030	22, 041	25, 143	19, 996	18, 855	17, 479	14, 884	14, 922	215, 056
1925	15, 202	12, 845	14, 898	15, 436	18, 529	24, 025	25, 825	24, 176	20, 520	21, 029	17, 059	14, 012	223, 556
1926	14, 853	13, 568	15, 055	15, 531	14, 972	21, 777	21, 973	20, 736	18, 784	18, 699	15, 954	15, 986	207, 888
1927	12 707	14, 916	14, 956	16, 922	21, 301	22, 134	24, 134	22, 556	21, 522	18, 996	14, 278	13, 826	218, 248
1928	14, 409	13, 715	14, 654	15, 139	16, 253	19, 216	21, 741	18, 728	18, 222	18, 665	14, 179	11, 692	196, 613
1929	13, 781	13, 877	12, 261	12, 331	16, 750	18, 406	20, 548	18, 605	15, 289	14, 343	11, 829	10, 879	178, 899

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets. See 1927 Yearbook, p. 1084, for data for earlier years.

TABLE 466.—*Cheese: Receipts, gross weight, at five markets, by State of origin, 1921–1929*

NEW YORK

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
New York	22, 413	21, 770	16, 909	14, 478	14, 107	11, 180	11, 867	13, 390	11, 252
Wisconsin	17, 044	16, 100	19, 758	16, 339	18, 978	17, 587	19, 258	23, 002	27, 068
Illinois	7, 061	6, 997	8, 535	8, 382	7, 211	7, 406	7, 231	5, 132	4, 497
Pennsylvania	1, 623	1, 181	955	618	1, 105	745	434	745	588
Michigan	787	506	619	644	472	301	440	837	937
Ohio	773	632	321	136	374	363	587	646	678
Massachusetts	420	189	228	235	248	244	189	64	365
Indiana	187	182	277	581	2, 075	5, 653	3, 833	1, 923	1, 585
Nebraska	144	23	4	240	48	76	150	42	52
Missouri	131	315	170	48	98	158	287	123	7
Minnesota	112	494	249	352	118	551	279	179	188
New Jersey	97	46	40	48	16	18	204	186	69
Iowa	57	94	206	295	777	346	421	178	82
Virginia	24	5	4	49	23	12	3	24	220
Tennessee	15	74	3	8	15	13	1	34	15
Vermont	14	97	305	79	273	47	3	16	33
Other States	625	215	414	172	85	78	279	214	357
Canada	454	1, 189	428	255	140	585	1, 471	1, 537	2, 918
Total	51, 981	50, 109	49, 425	42, 959	46, 163	45, 363	46, 937	48, 272	50, 911

BOSTON

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929
New York	5, 868	6, 527	7, 402	5, 209	4, 546	4, 328	2, 831	3, 787	2, 847
Wisconsin	3, 294	3, 091	3, 392	4, 317	7, 787	6, 229	7, 170	9, 953	9, 260
Illinois	1, 782	2, 091	3, 881	2, 931	1, 782	3, 622	3, 261	1, 845	1, 754
Vermont	1, 444	471	623	736	432	413	124	47	34
Pennsylvania	132	136	183	181	206	152	197	56	10
Ohio	71	35	23	137	201	162	196	110	6
New Hampshire	55	75	50	41	6	5	2	2	1
Massachusetts	39	32	27	13	8	5	41	65	37
Indiana	36	66	28	1	47	60	170	388	161
Maine	35	17	38	5	4	114	143	147	1
Michigan	31	296	191	74	198	184	200	422	322
Other States	142	475	71	23	97	162	221	353	407
Canada	279	209	5	56		1	32	187	59
Total	13, 208	13, 521	15, 914	13, 724	15, 314	15, 437	14, 588	17, 362	14, 899

CHICAGO

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929
Wisconsin	76, 706	95, 656	110, 648	117, 439	119, 244	100, 676	109, 504	82, 954	67, 495
Illinois	3, 102	4, 011	4, 497	3, 965	4, 592	3, 293	2, 996	2, 900	1, 994
Minnesota	2, 687	1, 960	3, 177	2, 733	3, 108	3, 265	2, 503	2, 979	2, 999
Michigan	1, 687	1, 415	729	1, 241	118	238	550	137	192
Montana	313	26	203	311	81		66		1
Iowa	287	810	705	620	606	457	263	296	278
New York	221	2, 391	2, 429	1, 667	1, 282	2, 218	3, 489	4, 246	4, 652
Kansas	166	3	51	30	45	72	26	36	35
Pennsylvania	163	308	289	158	115	112	532	479	230
California	113	57			9	94	3	45	56
Ohio	99	301	147	91	745	315	532	176	111
South Dakota	78	17	16	64	2	106	138	9	29
Missouri	56	222	83	188	65	43	122	583	181
Texas	32	9	15	2	38	35	12	15	6
Colorado	27	104	16	34	192	42	31	58	197
Indiana	16	22	66	50	49	93	43	255	296
Utah	11	8	14	7	8	2	36	1	
New Jersey		45	24	95	32		41	445	780
Idaho		19	168	675	337	534	88	26	
Other States	85	90	122	281	81	250	916	1, 057	685
Canada		250	246	373	380	3, 259	1, 742	567	606
Total	85, 849	107, 724	123, 645	130, 024	131, 129	115, 104	123, 633	97, 264	80, 823

TABLE 466.—*Cheese: Receipts, gross weight, at five markets, by State of origin, 1921–1929*—Continued

PHILADELPHIA

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Wisconsin	8, 487	10, 638	8, 884	8, 003	10, 850	11, 428	12, 723	14, 735	13, 825
New York	7, 068	4, 660	4, 538	3, 655	3, 627	2, 630	2, 462	2, 201	2, 145
Illinois	2, 557	2, 955	4, 126	4, 333	4, 073	4, 636	3, 704	2, 701	3, 075
Pennsylvania	2, 041	517	245	240	84	63	41	4	57
Ohio	205	223	136	26	11	133	86	82	52
New Jersey	121	14	36	3	3		9	74	
Indiana	100	95	142	95	201	122	115	110	137
Michigan	45	115	131	199	111	188	634	499	539
Minnesota	41	1	54		68	184	416	343	23
Iowa	3	25	44	164	37	1	3	2	4
Other States	284	73	27	148	30	69	77	122	41
Canada		8	(1)	(1)			126	166	75
Total	20, 952	19, 324	18, 363	16, 866	19, 095	19, 454	20, 396	21, 039	19, 973

SAN FRANCISCO

State of origin	1921	1922	1923	1924	1925	1926	1927	1928	1929
California	4, 800	3, 416	3, 650	2, 603	2, 316	2, 123	2, 515	3, 508	3, 449
Oregon	2, 245	2, 448	2, 557	2, 710	3, 029	3, 148	3, 273	2, 877	3, 374
Wisconsin	1, 064	1, 353	1, 979	2, 216	1, 987	2, 694	2, 198	1, 820	1, 136
Illinois	505	855	1, 441	821	463	222	192	91	3
New York	388	314	249	310	307	529	596	572	734
Colorado	176	322	222	256	323	294	241	225	179
Washington	145	108	112	58	120	50	91	17	17
Idaho	139	222	1, 039	2, 262	2, 835	2, 858	3, 331	3, 334	3, 303
Utah	24	10	17	76	164	387	199	30	59
Montana		56	338	5	64	79	1	160	3
Minnesota			63	152	154	94	24		(1)
Other States	146	53	23	13	93	52	33	42	36
Total	9, 632	9, 157	11, 690	11, 482	11, 855	12, 530	12, 694	12, 676	12, 293

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Not over 500 pounds.

TABLE 467.—*American cheese:*[1] *Cold-storage holdings, United States, 1915–1929*[2]

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1915									28, 575	24, 144	32, 428	31, 271
1916	28, 558	18, 908	13, 373	8, 443	6, 546	7, 301	16, 357	31, 569	46, 776	49, 579	45, 713	37, 080
1917	31, 855	22, 113	15, 560	9, 842	7, 928	11, 626	34, 159	67, 595	91, 545	90, 671	78, 087	75, 166
1918	66, 784	56, 298	37, 743	27, 965	17, 736	20, 395	30, 054	48, 804	55, 742	42, 065	33, 402	25, 625
1919	19, 823	15, 486	9, 837	6, 750	6, 027	12, 478	37, 501	62, 645	76, 661	81, 359	72, 889	62, 508
1920	53, 168	43, 631	34, 039	23, 431	16, 963	13, 502	29, 654	51, 512	60, 372	55, 007	48, 566	39, 921
1921	34, 115	25, 000	17, 477	14, 294	13, 466	17, 814	34, 948	41, 284	46, 635	45, 163	42, 969	34, 055
1922	27, 691	21, 430	15, 006	10, 745	10, 868	15, 481	33, 130	46, 580	53, 625	49, 473	40, 852	37, 291
1923	33, 617	26, 593	20, 693	14, 465	14, 077	17, 507	36, 834	55, 839	63, 960	62, 384	57, 927	55, 105
1924	49, 566	40, 506	35, 160	28, 294	26, 202	27, 172	45, 239	65, 864	76, 406	73, 153	67, 905	58, 605
1925	49, 187	41, 552	34, 647	27, 716	26, 147	29, 550	46, 468	66, 634	76, 512	78, 582	71, 913	66, 495
1926	58, 457	50, 339	42, 587	38, 041	35, 597	39, 346	54, 069	73, 681	81, 297	77, 646	72, 491	63, 881
1927	54, 596	46, 026	39, 382	35, 193	32, 487	35, 826	49, 999	67, 091	69, 749	65, 453	59, 035	53, 447
1928	47, 765	41, 793	36, 710	31, 887	30, 207	36, 716	53, 646	73, 088	83, 906	81, 833	82, 318	74, 325
1929	68, 075	57, 764	49, 546	45, 105	42, 032	47, 641	62, 737	79, 907	86, 558	84, 815	78, 058	71, 065

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] Quantities given are net weight.
[2] The term "American cheese" is intended to cover only those varieties known as twins, flats, daisies, Cheddars, longhorns, and square prints. It does not, therefore, include all kinds of cheese made in America.

TABLE 468.—*Cheese: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Netherlands	522	127,379	1,163	175,711	1,081	185,706	1,284	214,565	1,484	202,999
New Zealand	3	55,561	2	154,196	1	163,693	7	167,193	1	175,534
Canada	1,054	167,260	10,274	150,743	1,219	134,657	1,721	110,533	1,779	114,152
Italy	13,308	60,560	3,868	86,228	7,920	72,947	13,123	70,078	10,210	80,454
Swtizerland	7,150	70,075	3,765	51,726	3,456	61,972	3,638	75,058	3,396	62,695
Denmark	1,414	527	819	18,783	1,427	15,345	1,102	11,644	869	13,417
Australia	360	799	[1] 550	[1] 9,609	[1] 1,859	[1] 4,803	[1] 2,097	[1] 2,338	-------	-------
Argentina	10,447	[2] 6	3,402	657	3,431	866	3,228	1,224	-------	763
Yugoslavia	0	0	164	4,861	342	4,180	389	5,826	325	4,132
Finland	478	2,086	33	8,421	62	6,364	34	6,502	-------	3,634
Czechoslovakia	0	0	1,777	8,048	1,964	7,732	2,534	8,463	2,626	7,923
Hungary	-------	-------	1,923	1,769	1,626	1,834	1,733	2,609	1,784	1,398
Bulgaria	[3] 52	[2] 5,972	0	199	42	187	19	5,790	-------	1,931
Russia	3,911	7,011	[1] 289	[1] 14	[1] 130	[1] 72	[1] 133	[1] 1,847	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	257,407	950	331,500	1,950	333,187	2,994	325,891	5,363	333,307	5,852
Germany	48,687	1,967	162,940	2,491	141,345	2,320	158,740	3,160	135,530	3,664
United States	46,346	5,142	62,403	9,190	78,417	3,903	79,796	3,410	81,403	2,600
France	49,056	26,880	34,064	29,978	34,673	31,481	36,856	25,595	43,907	41,797
Belgium	31,771	354	38,275	1,817	33,187	1,239	36,538	1,001	39,025	904
Austria	[4] 12,298	[4] 966	7,970	681	7,665	1,376	7,553	1,387	6,401	2,461
Algeria	6,592	138	7,897	278	5,464	234	6,849	210	8,821	185
Egypt	8,182	[5] 48	7,157	155	6,842	79	6,740	176	7,085	155
Spain	5,032	53	5,307	133	7,023	79	[1] 7,576	[1] 447	-------	-------
Cuba	4,520	7	5,499	3	4,463	2	5,210	3	-------	-------
Irish Free State	0	0	2,823	483	2,740	403	2,414	212	2,449	133
Sweden	946	41	1,214	730	1,375	656	1,522	574	1,501	145
Dutch East Indies	757	0	1,362	0	1,763	0	1,997	0	[6] 1,514	0
Norway	663	377	1,301	702	1,266	757	1,452	894	1,090	927
British India	1,314	0	1,157	6	1,190	5	1,332	4	1,218	6
Tunis	1,382	19	1,185	10	1,125	22	1,314	14	1,430	47
Brazil	4,178	[2] 1	1,101	0	1,545	0	1,395	0	-------	-------
Union of South Africa	4,991	3	256	190	344	114	483	239	639	83
Total 32 countries	522,821	534,182	701,440	719,762	688,174	706,022	714,700	726,359	687,794	727,991

Bureau of Agricultural Economics. Official sources except where otherwise noted. All cheese made from milk, including "cottage cheese."

[1] International Yearbook of Agricultural Statistics.
[2] 4-year average.
[3] 3-year average.
[4] Average for Austria-Hungary.
[5] 1 year only.
[6] Java and Madura only.

TABLE 469.—*Cheese, No. 1 American fresh flats: Average wholesale price per pound, New York, 1924–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1924	22	22	21	17	17	20	21	21	22	20	21	23	21
1925	24	24	24	23	21	23	24	25	25	26	27	27	24
1926	------	24	23	21	20	22	23	23	24	25	------	------	------
1927	------	------	23	------	23	24	25	26	27	28	------	------	------
1928	27	24	23	22	23	25	26	26	27	------	26	26	------
1929	25	24	24	23	22	24	24	23	24	25	24	22	24

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the market.

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TABLE 470.—*Oleomargarine: Production and consumption in the United States, 1924–1928*

Year beginning July	Production			Stocks beginning of year	Exports	Stocks end of year	Consumption	
	Colored	Uncolored	Total				Total	Per capita
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*Lbs.*
1924	11, 280	204, 123	215, 403	2, 607	887	2, 720	214, 403	1. 87
1925	13, 181	234, 866	248, 047	2, 720	1, 256	2, 942	246, 569	2. 12
1926	14, 502	242, 655	257, 157	2, 942	942	3, 299	255, 858	2. 17
1927	15, 351	279, 348	294, 699	3, 299	732	3, 187	294, 079	2. 46
1928	16, 306	316, 816	333, 122	3, 187	633	4, 191	331, 485	2. 74

Bureau of Agricultural Economics. Production and stocks from reports of the Bureau of Internal Revenue. Exports from reports of the Bureau of Foreign and Domestic Commerce. See 1927 Yearbook, p. 1088, for data for earlier years.

TABLE 471.—*Oleomargarine: Materials used in manufacture, 1917–1928*

Material	Year beginning July—											
	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Oleo oil	96, 378	97, 464	89, 842	49, 676	40, 980	46, 645	52, 265	44, 102	47, 418	48, 741	45, 477	47, 185
Coconut oil	61, 773	69, 640	80, 784	103, 112	57, 394	65, 656	83, 059	79, 449	98, 307	107, 654	141, 000	171, 412
Cottonseed oil	36, 454	37, 846	39, 450	18, 533	15, 420	18, 757	20, 640	20, 966	25, 608	23, 372	24, 801	28, 173
Milk	61, 128	68, 000	76, 000	79, 716	53, 939	59, 835	69, 090	61, 924	72, 662	73, 700	83, 115	94, 752
Peanut oil	21, 593	38, 764	48, 346	16, 332	11, 625	6, 922	5, 656	4, 392	5, 257	4, 872	5, 459	6, 617
Salt	18, 279	21, 432	24, 864	25, 365	16, 262	17, 998	20, 593	18, 725	20, 593	21, 683	25, 024	27, 311
Oleo stearine	3, 427	2, 456	2, 132	4, 858	4, 574	4, 815	5, 317	5, 250	5, 314	5, 145	5, 532	5, 834
Neutral lard	45, 702	45, 764	38, 456	29, 268	27, 057	29, 568	32, 210	25, 674	25, 172	24, 872	25, 036	24, 189
Oleo stock	7, 526	6, 342	5, 804	2, 065	2, 143	2, 322	2, 756	3, 183	3, 082	2, 552	1, 738	1, 294
Butter	4, 548	5, 680	6, 845	1, 499	1, 107	1, 576	1, 900	1, 509	2, 330	2, 070	2, 484	2, 611
Corn oil	60	40	35	926			457	196	174	183	38	
Soybean oil				461					1	33		
Edible tallow				233			24	111	93	219	70	26
Mustard-seed oil				110			38	27	34	53	56	12
Coloring				26	11	11	26	38	41	18	19	47
Miscellaneous	14	11	14	9, 776	3, 417	2, 918	432	688	1, 374	918	1, 220	1, 474
Total	356, 882	393, 439	412, 572	341, 956	233, 929	257, 023	294, 463	266, 234	307, 460	316, 085	361, 069	410, 937

Bureau of Agricultural Economics. 1917–1919, Institute of Margarin Manufacturers; 1920–1928, annual reports of the Bureau of Internal Revenue.

TABLE 472.—*Oleomargarine, standard, uncolored: Monthly average wholesale price per pound, Chicago, 1914–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
Average:	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1914–1920	24. 6	24. 4	24. 1	24. 4	25. 0	25. 0	24. 9	24. 9	25. 3	25. 4	26. 1	26. 1	25. 0
1921–1925	22. 3	21. 7	21. 3	20. 7	20. 4	20. 1	20. 5	21. 3	21. 4	21. 6	22. 0	22. 3	21. 3
1914	18. 0	18. 0	18. 0	17. 0	17. 0	17. 0	17. 0	17. 0	18. 0	18. 0	18. 0	18. 0	17. 6
1915	18. 0	18. 0	18. 0	18. 0	17. 0	17. 0	17. 0	17. 0	17. 0	17. 0	17. 0	17. 0	17. 3
1916	17. 0	17. 0	17. 0	18. 0	19. 0	19. 0	19. 0	19. 0	19. 0	20. 0	22. 0	24. 0	19. 2
1917	22. 5	22. 5	22. 5	24. 5	25. 5	25. 5	25. 5	25. 5	26. 5	28. 5	28. 5	28. 5	25. 5
1918	28. 5	28. 5	28. 5	28. 5	28. 5	28. 5	28. 5	29. 5	29. 5	30. 5	32. 5	32. 5	29. 5
1919	32. 5	32. 5	31. 5	31. 5	34. 5	35. 5	35. 5	35. 5	36. 5	34. 5	35. 5	35. 5	34. 3
1920	35. 5	34. 4	33. 5	33. 5	33. 5	32. 6	31. 7	30. 5	30. 5	29. 5	29. 5	27. 0	31. 8
1921	24. 9	23. 6	22. 2	20. 5	19. 8	18. 5	18. 9	20. 5	20. 5	20. 5	20. 1	19. 5	20. 8
1922	19. 0	17. 5	17. 5	17. 5	17. 5	17. 5	18. 2	18. 5	18. 5	18. 5	19. 2	20. 5	18. 3
1923	20. 5	20. 5	20. 5	20. 5	20. 5	20. 5	20. 5	20. 5	21. 0	21. 5	22. 2	22. 5	20. 9
1924	22. 5	22. 5	21. 9	20. 5	20. 5	20. 5	21. 2	22. 5	22. 5	23. 0	24. 0	24. 5	22. 2
1925	24. 5	24. 5	24. 5	24. 5	23. 9	23. 5	23. 7	24. 5	24. 5	24. 5	24. 5	24. 5	24. 3
1926	24. 5	24. 3	23. 5	23. 3	22. 5	22. 5	22. 5	22. 5	22. 5	22. 5	21. 8	21. 5	22. 8
1927	21. 5	21. 5	21. 5	21. 5	21. 5	21. 5	21. 5	21. 5	23. 9	24. 5	23. 5	23. 5	22. 3
1928	23. 5	23. 5	23. 5	21. 5	21. 5	21. 5	21. 5	21. 5	22. 0	23. 5	23. 5	23. 5	22. 5
1929	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5	23. 5

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics Wholesale Price Bulletins.

TABLE 473.—*Poultry, live: Freight receipts, by States, at New York, 1927, 1928, 1929, and monthly, 1929*

State	1927	1928	1929												
			Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Car-loads	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*	*Car-loads*
Ala.	82	176	181	11	22	24	37	23	16	10	12	2	1	15	8
Ark.	420	410	369	43	40	40	52	45	34	38	35	10	7	10	15
Colo.	52	89	86	7	9	5	2	5	4	7	11	5	9	12	10
Fla.	45	151	179	12	29	28	60	27	14	3	3			2	1
Ga.			2			1	1								
Ill.	1,227	874	880	53	36	28	36	40	46	61	76	105	140	119	140
Ind.	1,267	842	983	49	29	19	39	42	51	72	84	107	164	156	151
Iowa	856	586	354	24	4	2	1		19	44	45	46	64	44	61
Kans.	661	474	422	59	28	27	27	30	32	22	37	45	45	28	42
Ky.	739	741	397	31	32	46	67	41	23	17	22	23	27	31	37
La.		1													
Mass.		1													
Mich.		6	6							1	1	4			
Minn.	223	164	131	6			1		4	9	14	20	36	25	16
Miss.	154	188	90	7	28	21	15	9	1	1	1			6	1
Mo.	2,147	1,896	1,874	127	78	82	122	120	112	173	235	211	216	182	216
Nebr.	996	1,078	1,156	101	55	40	36	60	87	89	112	136	168	125	147
N. Mex.	1	4	13	2	3	5	3								
N. Y.		1	1								1				
N. C.	91	158	240	30	34	60	52	19	11	11	10	6	4	1	2
N. Dak.		33	57								3	7	24	21	2
Ohio	429	343	335	9	2		1		16	18	16	44	77	80	72
Okla.	751	873	835	112	100	103	99	72	61	49	75	51	40	37	36
Pa.	58	36	44	3	5	9		2	1	3	2	1	2	9	7
S. C.	29	41	125	11	17	28	28	19	8	5	4	1	1		3
S. Dak.	187	313	273	19	8	6	5	9	10	24	19	32	45	48	48
Tenn.	975	1,060	884	77	101	125	203	114	50	51	46	22	19	34	42
Tex.	365	436	348	55	67	58	51	42	29	12	6	2	1	16	9
Utah			4					1	3						
Va.	56	68	56	2	4	3	16	6	2	3	3	1		9	7
Wis.	253	219	175	2	1			3	15	31	20	30	35	27	11
Wyo.	2	5	13	2	1		1		1			1	1	3	3
Other States	38														
Total	12,104	11,267	10,493	854	733	760	955	729	650	754	893	912	1,126	1,040	1,087

TABLE 474.—*Poultry, live: Freight receipts, make-up of cars unloaded, by classes, at New York, 1927–1929*

Class	1927	1928	1929												
			Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Prr cent*	*Per cent*	*Per cent*
Fowls	66.2	68.9	65.5	76.7	88.4	91.0	91.4	87.5	79.0	59.9	49.5	47.0	46.3	43.1	52.6
Broilers	5.9	4.9	5.1	.4	.5	.4	2.7	7.4	15.4	25.7	14.5	1.6	.1	.1	.2
Chickens	22.4	20.0	22.6	17.1	7.1	4.3	1.1	.2	1.0	10.9	32.8	48.3	49.9	38.4	31.6
Cocks	2.3	2.3	1.9	1.9	2.1	2.4	2.6	3.6	2.1	2.8	2.1	1.7	1.1	.9	1.0
Capons	.3	.3	.2	.9	.7	.3	.0	.0	.2	.0	.0	.0	.0	.0	.2
Ducks	1.7	1.3	1.6	1.0	.4	.5	.4	.4	.4	.6	1.0	1.3	2.2	3.8	5.1
Geese	1.0	1.0	1.1	1.2	.3	.3	.1	.0	.1	.0	.1	.1	.3	2.9	5.6
Turkeys	.9	1.1	1.6	.5	.4	.4	.3	.3	.2	.0	.0	.0	.1	10.8	3.6
Miscellaneous	.2	.2	.4	.3	.1	.4	1.4	.6	1.6	.1	.0	.0	.0	.0	.1

Bureau of Agricultural Economics.

TABLE 475.—*Poultry, dressed: Receipts, gross weight, at four markets, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
BOSTON													
1920	3,934	1,749	1,597	1,037	1,464	2,221	1,858	1,696	2,096	2,628	5,911	7,895	34,086
1921	3,377	2,229	1,465	1,707	1,795	2,086	1,499	2,437	2,482	3,581	7,472	9,791	39,921
1922	4,175	2,765	2,478	1,705	2,551	2,883	2,091	2,198	2,479	3,306	7,488	10,444	44,563
1923	7,690	3,785	2,917	1,946	2,439	2,778	2,427	2,661	2,674	4,418	10,752	11,526	56,013
1924	6,210	4,607	3,072	2,235	2,602	2,952	3,492	2,856	3,270	4,402	11,842	13,724	61,264
1925	4,200	3,252	2,697	2,181	2,582	2,893	2,893	2,786	2,554	4,336	7,907	8,439	46,720
1926	3,778	2,981	2,837	2,052	2,598	3,196	3,161	3,677	3,960	4,089	8,891	11,942	53,162
1927	4,318	3,610	2,440	2,398	3,653	3,455	2,996	3,612	3,404	4,663	8,511	10,245	53,305
1928	4,591	3,756	4,137	2,877	3,285	3,290	3,899	3,468	3,355	4,680	7,716	10,329	55,583
1929	4,586	3,231	2,315	2,855	2,718	3,369	3,153	3,628	4,309	5,048	8,826	10,395	54,433
NEW YORK													
1920	11,217	7,557	3,928	1,367	5,480	5,292	6,129	4,428	6,273	8,053	17,651	23,718	101,093
1921	11,441	7,006	5,190	5,021	4,883	6,150	5,314	8,992	10,277	11,887	21,182	27,208	124,551
1922	10,783	6,909	6,371	6,399	7,896	8,822	6,785	7,768	9,115	12,594	22,232	32,538	138,212
1923	21,730	12,335	8,390	6,916	6,804	8,589	9,414	9,497	9,653	16,509	26,822	27,289	163,948
1924	15,603	11,927	9,893	7,368	10,172	10,157	10,502	10,504	12,981	15,916	28,875	35,464	179,362
1925	14,400	10,871	7,949	8,119	10,245	10,717	11,668	11,110	12,409	16,696	28,857	27,216	170,257
1926	13,078	10,646	9,921	8,248	10,594	14,041	13,555	14,609	15,068	18,129	31,924	33,082	192,895
1927	12,954	8,957	8,722	7,770	11,633	13,635	12,168	14,589	15,470	17,682	31,740	32,797	188,117
1928	14,999	11,064	9,322	9,703	10,628	11,127	13,252	13,850	14,332	21,799	31,846	32,454	194,376
1929	14,221	10,900	9,964	9,520	10,233	11,876	13,078	15,707	16,558	20,602	31,495	32,903	197,057
PHILADELPHIA													
1920	1,553	1,881	1,906	918	1,466	1,286	1,019	1,215	1,044	1,588	2,348	5,382	21,606
1921	1,498	1,071	1,411	1,005	1,303	1,565	1,226	1,419	1,587	2,020	2,882	5,905	22,892
1922	1,947	1,790	1,077	664	1,182	1,304	1,237	1,217	1,237	1,356	2,653	5,655	21,319
1923	2,206	1,530	1,388	1,042	1,055	1,509	1,343	1,618	1,348	1,749	3,281	6,542	24,611
1924	2,614	1,818	1,704	1,194	1,234	1,458	1,536	1,660	1,421	1,873	4,053	7,075	27,640
1925	2,818	2,030	2,183	1,450	1,343	1,638	1,739	1,810	1,552	1,924	4,702	6,106	29,295
1926	2,906	1,791	2,203	1,717	1,374	1,758	1,853	2,039	2,352	2,123	4,916	7,094	32,126
1927	2,885	2,006	2,005	1,769	1,695	1,668	1,398	1,918	2,530	2,613	4,432	6,903	31,822
1928	2,373	1,601	1,885	1,359	1,558	2,177	1,931	1,763	2,097	2,965	4,925	7,210	31,844
1929	2,548	1,851	1,680	1,471	1,557	1,663	2,134	2,319	2,302	2,542	6,002	8,595	34,664
CHICAGO													
1920	6,646	2,687	980	816	1,512	2,369	2,379	2,659	3,370	4,001	10,752	19,153	57,324
1921	6,343	3,328	2,794	2,104	2,421	2,524	2,097	2,615	3,804	4,157	15,723	17,082	64,992
1922	5,345	3,042	3,394	2,744	2,744	3,597	3,590	4,250	4,290	4,178	13,167	23,320	73,661
1923	11,497	5,208	4,057	2,532	2,912	3,329	3,679	4,018	4,724	5,411	15,163	27,743	90,273
1924	12,723	8,043	5,675	4,385	3,311	3,295	4,042	2,523	2,196	4,791	15,675	21,805	88,464
1925	6,167	3,230	2,219	1,573	1,996	2,239	1,376	1,760	2,168	4,303	20,022	25,033	72,086
1926	6,360	3,159	2,383	1,792	1,805	2,105	2,154	2,607	2,897	6,397	22,863	23,110	77,632
1927	6,495	3,546	2,195	1,835	2,872	2,257	1,227	2,257	2,531	3,752	15,739	19,029	63,735
1928	6,639	3,591	2,216	1,876	2,137	1,977	2,771	2,829	3,580	5,719	15,301	18,544	67,180
1929	7,712	3,469	2,707	2,725	2,811	3,270	3,520	3,984	4,710	9,070	25,578	23,812	93,368
TOTAL													
1920	23,350	13,874	8,411	4,138	9,922	11,168	11,385	9,998	12,783	16,270	36,662	56,148	214,109
1921	22,659	13,634	10,860	9,837	10,402	12,325	10,136	15,463	18,150	21,645	47,259	59,986	252,356
1922	22,250	14,506	13,320	11,512	14,373	16,606	13,703	15,433	17,121	21,434	45,540	71,957	277,755
1923	43,123	22,858	16,752	12,436	13,210	16,205	16,863	17,794	18,399	28,087	56,018	73,100	334,845
1924	37,150	26,395	20,344	15,182	17,319	17,862	19,572	17,543	19,868	26,982	60,445	78,068	356,730
1925	27,585	19,383	15,048	13,323	16,166	17,487	17,676	17,466	18,683	27,259	61,488	66,794	318,358
1926	26,122	18,576	17,344	13,809	16,371	21,099	20,724	22,932	24,278	30,738	68,594	75,228	355,815
1927	26,652	18,119	15,362	13,772	19,853	21,015	17,789	22,376	23,935	28,710	60,422	68,974	336,979
1928	28,602	20,012	17,560	15,815	17,608	18,571	21,853	21,910	23,564	35,163	59,788	68,537	348,983
1929	29,067	19,451	16,666	16,571	17,319	20,178	21,885	25,638	27,879	37,262	71,901	75,705	379,522

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

TABLE 476.—*Poultry, dressed: Receipts, gross weight, at four markets, by State of origin, 1922–1929*

BOSTON

State	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Illinois	19, 618	23, 308	20, 155	12, 292	14, 768	14, 203	11, 719	10, 651
Indiana	5, 939	6, 558	7, 382	6, 524	4, 884	5, 225	5, 368	3, 200
Iowa	4, 422	7, 131	6, 834	6, 057	8, 141	7, 003	6, 648	7, 609
Ohio	1, 708	1, 141	1, 216	255	300	533	390	140
Kansas	1, 454	2, 114	2, 864	3, 566	4, 027	3, 592	4, 557	4, 917
New York	1, 454	1, 850	1, 111	1, 045	1, 251	1, 467	1, 709	757
Oklahoma	1, 253	1, 043	1, 737	1, 699	1, 571	2, 066	2, 662	1, 364
Minnesota	1, 076	2, 222	3, 878	3, 929	5, 076	5, 886	6, 860	6, 786
Michigan	1, 015	527	911	622	524	681	888	663
Kentucky	1, 005	1, 330	854	822	970	453	204	141
Missouri	774	1, 086	2, 540	1, 822	1, 944	1, 509	1, 881	2, 722
Wisconsin	680	291	612	375	1, 236	553	932	266
Maine	647	791	706	709	438	690	509	500
Nebraska	471	682	1, 336	1, 707	2, 297	1, 930	3, 298	3, 163
Massachusetts	413	357	344	205	260	495	85	27
Vermont	200	149	105	74	34	26	28	31
Tennessee	65	39	73	118	234	160	330	510
New Hampshire	53	47	50	41	29	62	17	15
Pennsylvania	49	72	114	180	47	260	104	1
Maryland	39	59	92	11	24	2	----------	----------
North Dakota	14	294	314	237	553	469	478	1, 473
South Dakota	3	121	101	92	131	46	114	559
Texas	[1]	[1]	6, 185	2, 797	3, 703	5, 110	5, 034	6, 693
Other States	2, 189	4, 681	1, 750	467	555	812	1, 761	2, 245
Canada	22	120	----------	174	165	72	7	----------
Total	44, 563	56, 013	61, 264	46, 720	53, 162	53, 305	55, 583	54, 433

NEW YORK

State	1922	1923	1924	1925	1926	1927	1928	1929
Illinois	40, 911	48, 267	57, 246	45, 861	32, 890	28, 356	24, 864	25, 393
Indiana	17, 021	15, 814	14, 886	15, 215	12, 918	11, 585	11, 624	11, 480
Iowa	15, 854	19, 520	18, 775	18, 776	29, 840	25, 226	26, 324	30, 819
Missouri	10, 522	14, 630	18, 629	17, 148	19, 146	19, 231	19, 817	19, 305
Kansas	10, 174	15, 151	8, 429	11, 379	20, 757	20, 725	21, 070	20, 448
Texas	5, 296	7, 206	12, 108	6, 665	1, 059	13, 192	16, 181	18, 386
Ohio	5, 113	4, 131	4, 337	4, 352	3, 298	3, 920	2, 306	3, 399
Minnesota	4, 412	6, 382	9, 143	9, 372	11, 840	10, 820	13, 937	12, 914
Tennessee	3, 964	3, 445	4, 070	2, 773	3, 531	4, 507	4, 542	3, 384
Kentucky	3, 873	5, 524	5, 082	4, 361	4, 497	4, 700	5, 234	3, 050
New York	3, 572	3, 062	3, 119	11, 459	12, 966	16, 438	14, 167	12, 489
Nebraska	2, 515	3, 036	4, 610	4, 288	6, 979	7, 041	9, 057	8, 120
Oklahoma	2, 254	2, 704	2, 553	3, 105	6, 336	7, 314	5, 478	7, 042
Virginia	1, 904	1, 956	2, 588	1, 899	2, 299	2, 229	2, 158	2, 013
Michigan	1, 901	1, 683	1, 399	702	952	659	2, 561	1, 962
Wisconsin	1, 503	2, 364	2, 862	3, 058	2, 787	1, 843	1, 551	934
New Jersey	1, 395	1, 552	1, 661	1, 303	1, 298	1, 022	649	211
Maryland	1, 226	860	959	1, 021	896	757	346	238
Pennsylvania	1, 220	1, 085	1, 148	922	911	1, 332	660	524
South Dakota	976	1, 140	1, 299	1, 795	2, 970	3, 413	3, 595	4, 692
Massachusetts	848	632	1, 408	1, 146	461	425	336	347
California	649	1, 061	528	459	605	318	1, 117	1, 753
North Dakota	165	769	515	668	1, 056	1, 028	1, 236	1, 841
Arkansas	129	326	[1]	760	788	78	40	442
Delaware	109	64	84	91	65	56	54	31
Colorado	[1]	[1]	530	434	600	315	1, 180	598
Washington	[1]	238	173	205	673	248	190	619
Idaho	[1]	[1]	242	176	416	244	1, 656	1, 730
Montana	[1]	[1]	203	123	120	202	471	315
Other States	503	814	601	462	843	846	1, 928	2, 558
Canada	203	532	175	279	98	47	47	20
Total	138, 212	163, 948	179, 362	170, 257	192, 895	188, 117	194, 376	197, 057

[1] Included in "Other States."

Table 476.—*Poultry, dressed: Receipts, gross weight, at four markets, by State of origin, 1922–1929*—Continued

CHICAGO

State	1922	1923	1924	1925	1926	1927	1928	1929
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Iowa	19, 001	18, 654	21, 023	21, 538	21, 420	14, 719	13, 117	18, 505
Illinois	18, 720	17, 497	13, 184	4, 517	5, 920	3, 893	2, 581	3, 411
Wisconsin	7, 555	7, 372	7, 771	5, 384	5, 701	3, 982	3, 409	4, 811
Minnesota	7, 310	10, 764	11, 425	10, 267	12, 586	10, 541	7, 829	13, 833
Missouri	3, 952	6, 231	5, 980	4, 621	3, 828	4, 812	6, 379	6, 647
South Dakota	3, 348	4, 509	6, 396	5, 954	7, 388	6, 069	7, 371	10, 366
North Dakota	3, 292	7, 594	5, 984	5, 714	6, 041	4, 769	5, 933	8, 502
Kansas	2, 499	3, 602	3, 252	3, 411	4, 110	2, 915	4, 315	5, 108
Nebraska	1, 959	1, 813	1, 690	2, 149	2, 632	3, 247	4, 295	4, 169
Indiana	1, 347	818	849	731	411	536	559	778
Kentucky	849	937	508	80	107	208	32	124
Oklahoma	801	2, 217	2, 164	2, 476	1, 998	2, 250	2, 712	2, 830
Texas	709	4, 507	4, 077	1, 802	1, 378	2, 577	3, 302	6, 930
Tennessee	694	810	564	186	371	377	361	483
Michigan	332	276	186	82	40	66	379	62
Montana	271	1, 500	2, 095	1, 738	1, 773	1, 022	1, 530	2, 904
Arkansas	256	372	315	117	177	238	688	193
New York	247	335	339	385	837	715	661	837
Mississippi	169	94	49	12	3	6	7	38
Idaho	69	40	75	131	26	120	171	551
Colorado	63	80	169	390	222	228	293	378
Wyoming	17	39	109	81	98	133	260	373
Other States	173	182	260	179	194	312	941	1, 535
Canada	28	30	----------	141	371	----------	55	----------
Total	73, 661	90, 273	88, 464	72, 086	77, 632	63, 735	67, 180	93, 368

PHILADELPHIA

State	1922	1923	1924	1925	1926	1927	1928	1929
Illinois	7, 165	9, 497	9, 456	8, 728	5, 505	4, 232	1, 940	1, 531
Virginia	2, 241	2, 588	2, 448	2, 331	1, 745	1, 458	1, 097	1, 166
Indiana	1, 907	1, 762	1, 231	1, 750	3, 659	4, 135	3, 263	2, 917
Pennsylvania	1, 372	1, 260	919	901	805	824	245	190
Minnesota	1, 274	2, 389	2, 252	2, 732	3, 796	4, 475	3, 062	4, 190
Ohio	1, 153	820	1, 206	741	507	696	491	397
Missouri	1, 088	522	1, 002	2, 315	2, 035	1, 168	1, 249	951
Iowa	1, 017	1, 124	1, 883	2, 700	3, 536	4, 179	4, 962	5, 558
West Virginia	985	957	982	1, 034	797	410	291	313
Kansas	660	655	932	910	885	1, 615	4, 901	3, 564
New York	424	368	1, 047	676	852	759	683	749
Wisconsin	396	406	268	697	787	544	570	374
Oklahoma	321	446	880	1, 302	2, 474	2, 067	2, 710	2, 984
Delaware	262	138	77	77	47	10	2	----------
Texas	213	130	798	303	1, 208	1, 829	1, 745	3, 450
Maryland	201	256	162	233	181	84	106	128
Nebraska	167	298	453	377	1, 354	673	1, 089	1, 438
Michigan	142	36	39	256	36	102	47	45
Kentucky	81	68	459	171	105	504	542	621
New Jersey	63	71	227	15	107	113	305	130
South Dakota	45	16	17	321	88	132	150	497
North Dakota	4	650	595	436	427	445	620	1, 140
Other States	138	154	307	289	1, 190	1, 368	1, 774	2, 331
Total	21, 319	24, 611	27, 640	29, 295	32, 126	31, 822	31, 844	34, 664

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Included in "Other States."

Table 477.—*Poultry, dressed: Receipts, gross weight, by State of origin, New York, by months, 1929*

State	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Illinois	2, 171	1, 681	1, 826	1, 645	1, 229	1, 428	1, 157	1, 254	1, 802	2, 608	3, 796	4, 796
Indiana	770	630	756	685	689	810	862	1, 090	1, 061	1, 332	1, 423	1, 372
Iowa	2, 341	1, 272	1, 147	560	305	1, 241	1, 852	1, 874	2, 904	4, 745	5, 450	7, 128
Missouri	997	876	568	462	852	1, 250	1, 652	2, 387	2, 245	2, 476	2, 329	3, 211
Kansas	1, 849	1, 033	839	769	966	1, 280	1, 656	1, 788	2, 536	2, 589	2, 943	2, 200
Texas	1, 690	1, 059	1, 136	1, 215	957	910	672	781	619	460	5, 066	3, 821
Ohio	196	143	459	369	361	33	28	118	142	415	430	705
Minnesota	1, 079	362	376	195	300	756	758	987	987	1, 817	2, 525	2, 771
Tennessee	189	108	147	621	427	265	273	517	302	227	128	180
Kentucky	58	120	140	384	495	129	170	404	361	267	302	220
New York	100	217	402	823	1, 686	1, 988	2, 379	2, 064	1, 269	843	526	192
Nebraska	806	660	288	282	393	570	408	697	805	973	1, 156	1, 082
Oklahoma	437	518	547	520	529	485	249	622	416	442	974	1, 303
Virginia	7	9	1	21	86	138	273	515	287	190	276	210
Michigan	71	180	597	388	405	-------	3	60	69	46	47	96
Wisconsin	92	49	38	133	31	2	38	47	20	66	240	178
New Jersey	48	35	15	6	25	5	7	25	6	6	14	19
Maryland	27	19	13	6	6	6	4	10	27	28	44	48
Pennsylvania	48	28	18	46	23	86	25	37	40	81	17	75
South Dakota	430	271	285	168	50	234	161	156	286	678	785	1, 188
Massachusetts	4	(1)	35	25	39	31	58	3	3	13	55	81
California	54	727	168	134	139	36	241	22	29	37	153	13
North Dakota	116	115	47	6	-------	83	-------	-------	29	28	701	716
Arkansas	(1)	-------	-------	-------	-------	-------	-------	24	143	83	149	43
Delaware	4	2	2	2	(1)	2	3	2	2	3	3	6
Colorado	(1)	28	23	(1)	(1)	14	(1)	-------	-------	-------	140	393
Washington	-------	90	(1)	24	185	25	-------	126	84	31	23	31
Idaho	380	145	24	-------	-------	-------	-------	25	-------	-------	881	275
Montana	25	134	15	2	-------	-------	-------	-------	-------	-------	37	102
Other States	232	389	52	29	55	69	149	72	84	118	862	448
Canada	-------	-------	-------	(1)	-------	-------	-------	-------	-------	(1)	20	(1)
Total	14, 221	10, 900	9, 964	9, 520	10, 233	11, 876	13, 078	15, 707	16, 558	20, 602	31, 495	32, 903

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets.

[1] Not over 500 pounds.

Table 478.—*Frozen poultry:* [1] *Cold-storage holdings, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1916	-------	-------	-------	-------	17, 847	6, 559	6, 216	7, 032	8, 882	20, 041	31, 175	27, 139
1917	32, 184	35, 601	27, 796	25, 988	67, 242	64, 286	60, 194	54, 132	56, 093	46, 737	51, 743	49, 561
1918	64, 557	68, 238	56, 950	44, 115	26, 523	18, 929	17, 652	18, 756	23, 034	29, 798	44, 433	71, 238
1919	108, 722	119, 675	109, 627	92, 897	71, 162	55, 616	49, 212	40, 573	32, 918	30, 492	33, 139	54, 749
1920	87, 512	92, 253	78, 421	61, 136	40, 525	30, 535	24, 790	22, 364	21, 331	22, 953	31, 070	49, 046
1921	79, 025	81, 096	79, 001	62, 315	47, 651	35, 408	27, 268	21, 188	20, 064	25, 602	34, 876	65, 167
1922	103, 697	103, 350	88, 709	68, 471	50, 840	38, 602	34, 837	30, 659	27, 671	25, 984	30, 238	51, 781
1923	100, 170	121, 632	113, 503	94, 872	74, 562	57, 274	49, 100	41, 250	34, 131	33, 142	40, 363	63, 274
1924	93, 434	99, 486	93, 497	76, 067	52, 068	39, 299	34, 886	33, 604	33, 837	40, 070	55, 139	87, 939
1925	133, 990	138, 189	130, 513	108, 608	82, 732	68, 126	58, 562	53, 558	47, 946	44, 345	53, 787	86, 733
1926	111, 501	108, 512	95, 397	73, 124	52, 783	42, 808	36, 730	35, 793	38, 634	44, 771	64, 842	106, 854
1927	144, 497	145, 076	129, 510	104, 697	77, 282	61, 525	50, 064	42, 293	39, 711	43, 201	52, 315	85, 030
1928	117, 490	118, 154	103, 494	83, 169	56, 832	43, 872	38, 230	40, 395	40, 749	43, 578	58, 093	79, 173
1929	109, 684	102, 380	89, 088	68, 728	52, 901	41, 643	42, 001	40, 896	49, 010	61, 976	86, 873	115, 876

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] Quantities given net weight.

Table 479.—*Chickens: Estimated average price per pound, received by producers, United States, 1910–1929*

Year beginning July—	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Apr. 15	May 15	June 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	12.2	12.0	11.8	11.4	11.0	10.6	10.6	10.6	10.7	10.9	11.0	11.1	11.0
1911	11.2	11.2	11.0	10.6	10.0	9.7	10.0	10.4	10.6	11.0	11.1	11.0	10.4
1912	11.2	11.3	11.4	11.4	11.0	10.8	10.8	11.0	11.4	11.7	11.9	12.0	11.2
1913	13.0	12.8	12.7	13.0	11.4	11.3	11.5	12.0	12.4	13.0	12.7	13.1	12.0
1914	13.4	13.1	12.8	12.0	11.1	10.7	10.9	11.3	11.7	11.9	12.0	12.2	11.5
1915	12.2	12.2	12.0	11.8	11.5	11.2	11.5	12.1	12.5	13.1	13.6	14.0	12.0
1916	14.1	14.1	14.2	14.4	13.9	13.6	14.1	15.1	15.7	17.3	17.5	17.7	14.6
1917	17.4	16.7	18.4	18.5	17.0	17.5	18.4	20.3	20.2	20.7	20.6	21.3	18.4
1918	23.2	23.4	23.6	22.2	21.7	22.4	22.1	21.8	23.4	25.7	26.7	26.4	23.0
1919	26.8	26.1	25.0	23.3	22.0	22.0	23.3	25.7	26.9	28.4	28.0	27.4	24.2
1920	28.4	26.6	26.9	24.6	22.9	20.6	21.7	22.3	22.8	22.2	21.8	21.5	22.8
1921	21.7	21.4	20.2	19.1	18.6	18.2	18.9	19.0	19.4	20.0	20.2	20.6	19.3
1922	20.7	18.9	18.6	18.1	17.2	17.2	17.3	18.6	18.8	19.4	20.1	20.3	18.2
1923	20.6	19.8	19.7	19.0	17.7	16.6	17.5	18.2	18.9	19.4	20.3	20.5	18.3
1924	20.2	20.0	19.8	19.4	18.5	17.9	18.5	19.1	20.0	21.1	22.0	21.6	19.2
1925	21.4	20.8	20.4	20.0	19.2	19.5	20.9	21.5	21.9	23.1	23.7	23.9	20.7
1926	23.6	22.1	21.4	20.8	20.0	19.8	20.1	21.1	21.3	21.8	21.7	20.2	20.7
1927	19.9	19.7	19.4	19.7	19.4	19.2	19.6	20.1	20.1	20.8	21.5	21.5	19.8
1928	21.9	21.6	22.3	22.0	21.5	21.2	21.6	22.1	22.7	23.8	24.4	24.6	22.1
1929	23.7	22.7	22.4	21.5	20.3	19.1	------	------	------	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number 1919 census by States; yearly price obtained by weighting monthly prices by receipts of dressed poultry. Average price of chickesn (live weight) of all ages as reported.

Table 480.—*Turkeys: Estimated average price per pound, received by producers, United States, 1912–1929*

Year beginning October—	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Year beginning October—	Oct. 15	Nov. 15	Dec. 15	Jan. 15
	Cents	*Cents*	*Cents*	*Cents*		*Cents*	*Cents*	*Cents*	*Cents*
1912	13.6	14.4	14.8	14.9	1921	25.7	28.2	32.5	30.7
1913	14.6	15.2	15.5	15.5	1922	25.1	29.5	32.3	29.7
1914	14.1	14.1	14.5	14.5	1923	26.6	27.9	24.5	23.1
1915	13.7	14.8	15.5	15.6	1924	23.3	24.2	25.8	26.2
1916	17.0	18.6	19.6	19.5	1925	24.0	28.3	31.1	31.7
1917	20.0	21.0	23.0	22.9	1926	26.6	29.8	32.8	31.6
1918	23.9	25.7	27.0	27.3	1927	26.4	30.8	32.3	29.8
1919	26.6	28.3	31.1	32.0	1928	27.2	31.2	30.5	28.2
1920	30.0	31.8	33.1	33.0	1929	27.2	27.1	23.5	--------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by number 1919 Census by States.

TABLE 481.—*Eggs: Receipts at five markets, specified years*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
BOSTON													
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
1927	120	153	245	307	270	234	155	128	109	92	65	82	1,960
1928	102	145	229	211	258	200	158	112	96	96	78	72	1,757
1929	133	99	190	290	234	177	176	125	110	77	54	53	1,718
NEW YORK													
1927	458	542	863	1,094	1,038	716	521	441	386	355	319	315	7,048
1928	412	613	931	1,052	1,089	767	591	494	407	392	268	272	7,288
1929	394	371	821	1,061	999	837	668	526	444	380	293	335	7,129
PHILADELPHIA													
1927	96	100	183	244	211	158	119	114	117	80	68	59	1,549
1928	97	133	176	210	246	175	168	117	140	103	75	95	1,735
1929	118	76	169	234	220	181	156	143	131	94	74	101	1,697
CHICAGO													
1927	243	326	628	1,002	935	594	363	255	231	127	101	96	4,901
1928	200	366	592	813	849	562	356	284	241	150	75	113	4,601
1929	206	222	554	924	799	554	342	301	210	135	62	89	4,398
SAN FRANCISCO													
1927	54	57	78	83	69	65	68	66	54	50	50	56	750
1928	52	63	106	75	61	59	61	69	54	52	49	55	756
1929	67	63	82	86	80	65	67	55	49	49	49	54	766
TOTAL													
1919	494	1,014	1,556	2,761	2,424	1,890	1,276	1,018	826	691	394	341	14,686
1920	508	815	1,447	1,934	2,203	1,805	1,143	911	806	594	398	382	12,946
1921	653	1,161	2,209	2,467	2,055	1,561	1,142	1,107	909	727	488	531	15,010
1922	809	1,025	1,952	2,902	2,583	1,926	1,304	1,019	816	704	484	492	16,016
1923	852	1,032	2,118	2,268	2,852	2,066	1,349	1,180	988	844	555	587	16,691
1924	714	1,006	1,654	2,539	2,544	1,871	1,431	1,042	876	748	457	524	15,406
1925	618	1,176	1,846	2,563	2,193	2,025	1,315	1,106	930	709	433	626	15,540
1926	906	1,070	1,741	2,086	2,261	2,015	1,386	1,081	933	699	581	752	15,511
1927	971	1,178	1,997	2,730	2,523	1,767	1,226	1,004	897	704	603	608	16,208
1928	863	1,320	2,034	2,361	2,503	1,763	1,334	1,076	938	793	545	607	16,137
1929	918	831	1,816	2,595	2,332	1,814	1,409	1,150	944	735	532	632	15,708

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets. Reported in cases of 30 dozen. See 1927 Yearbook, p. 1098, for data for earlier years.

TABLE 482.—*Eggs: Receipts by State of origin, 1922–1929*

BOSTON

State of origin	1922	1923	1924	1925	1926	1927	1928	1929 Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
Illinois	710	845	691	390	327	319	251	195	24	7	17	45	27	18	14	10	8	9	9	7
Indiana	320	233	185	156	163	211	152	133	5	2	14	35	26	16	13	7	7	3	2	3
Iowa	142	146	186	259	270	307	194	245	6	3	7	34	35	41	41	28	25	16	7	2
Minnesota	108	109	191	250	229	219	236	221	8	4	5	42	38	32	35	20	17	11	4	5
Ohio	108	87	75	39	52	115	53	52	6	1	2	9	8	6	5	6	6	3	[1]	[1]
Missouri	100	78	80	158	134	131	106	107	10	10	28	23	15	6	6	2	2	2	2	1
Maine	99	122	99	100	82	76	84	70	9	7	9	9	9	6	4	3	3	2	3	6
Kansas	83	61	57	174	182	206	244	253	23	19	35	21	28	16	23	23	22	18	13	12
Michigan	42	43	48	40	41	41	36	36	2	1	1	7	6	5	5	4	2	2	[1]	1
New York	40	36	37	28	31	41	32	31	6	1	1	6	3	1	3	2	3	2	1	2
New Hampshire	38	44	28	32	22	25	31	24	4	2	3	3	3	1	1	1	1	1	1	3
Vermont	37	36	25	27	18	17	22	17	2	1	2	2	3	2	1	1	1	1	[1]	1
Massachusetts	24	21	16	12	7	16	7	6	1	1	1	1	1	[1]	[1]	[1]	[1]	[1]	[1]	1
Nebraska	19	19	31	61	91	87	94	128	12	14	27	22	15	8	9	7	8	2	2	2
Other States	100	64	80	107	159	149	215	200	15	26	38	31	17	19	16	11	5	5	10	7
Total	1,970	1,944	1,829	1,833	1,808	1,960	1,757	1,718	133	99	190	290	234	177	176	125	110	77	54	53

CHICAGO

State of origin	1922	1923	1924	1925	1926	1927	1928	1929 Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Missouri	1,045	880	661	604	655	832	674	566	18	23	85	122	108	78	33	31	23	18	11	16
Iowa	843	996	892	888	875	927	826	804	35	44	88	182	137	109	65	53	42	31	9	9
Kansas	532	501	433	439	403	477	446	315	13	17	64	58	62	26	20	23	13	7	5	7
Wisconsin	474	584	592	473	485	503	427	477	31	30	34	86	95	56	41	37	28	14	7	18
Minnesota	462	610	644	573	618	583	545	688	39	39	52	130	137	90	71	50	40	21	8	11
South Dakota	405	551	595	564	514	445	467	445	12	9	30	91	81	74	52	44	30	17	3	2
Nebraska	352	359	465	511	464	420	438	429	24	22	73	74	76	60	34	36	14	8	2	6
Illinois	310	256	194	170	148	152	120	184	6	5	17	69	36	25	5	7	7	3	2	2
Oklahoma	103	101	72	87	70	82	96	68	3	6	39	8	4	5	1	[1]	[1]	[1]	[1]	2
North Dakota	23	33	46	42	53	27	38	45	2	1	3	14	9	6	4	3	2	1	[1]	[1]
Texas	22	49	25	14	13	36	97	67	3	5	29	21	7	2	[1]	[1]	[1]	[1]	[1]	[1]
Michigan	18	18	20	14	13	37	57	40	2	1	3	6	7	7	6	3	2	1	1	1
Arkansas	14	20	3	15	23	48	32	10	1	[1]	7	1	1	[1]	[1]	[1]	[1]	[1]	[1]	[1]
Other States	81	51	37	104	241	332	338	260	17	20	30	62	39	16	10	14	9	14	14	15
Total	4,684	5,009	4,679	4,498	4,575	4,901	4,601	4,398	206	222	554	924	799	554	342	301	210	135	62	89

NEW YORK

Illinois	1,379	1,342	1,223	1,258	939	950	869	771	37	33	85	156	120	97	76	48	37	29	21	32
Iowa	921	934	942	924	1,102	1,038	1,071	1,254	18	17	61	230	282	212	155	115	84	52	18	10
Indiana	726	575	526	568	542	566	468	437	12	9	52	108	76	67	46	31	15	7	6	8
Ohio	514	436	327	324	394	356	276	204	7	3	14	46	35	36	24	15	7	4	5	8
New York	491	645	615	688	637	605	666	660	57	41	63	93	93	81	58	46	35	27	27	39
Missouri	438	453	415	364	351	342	349	403	22	27	68	47	59	50	34	27	18	16	17	18
California	354	430	331	456	439	502	589	581	45	54	77	30	43	36	38	42	52	54	54	56
Pennsylvania	265	238	274	244	240	212	191	189	14	12	19	23	23	20	17	18	13	11	8	11
Tennessee	251	249	141	189	120	195	186	113	8	16	44	26	4	4	5	1	1	2	1	1
Kansas	222	242	181	197	237	214	280	318	14	18	54	34	49	34	31	22	22	20	12	8
Minnesota	217	264	261	246	201	178	204	195	4	2	10	20	30	29	29	17	21	18	7	8
Washington	143	271	254	375	543	655	661	669	76	52	48	35	39	50	52	54	64	71	61	67
Kentucky	143	103	61	74	69	97	63	23	1	1	6	9	1	1	(1)	(1)	1	(1)	1	2
New Jersey	134	199	222	216	213	194	180	214	16	17	25	29	27	21	17	14	12	10	11	15
Michigan	100	107	97	70	56	36	46	42	3	6	2	4	10	4	3	2	2	4	1	1
Maryland	84	124	124	118	118	141	131	88	5	7	13	12	11	8	6	7	5	4	4	6
Virginia	65	99	104	92	80	111	102	89	5	6	16	18	9	7	7	7	6	3	2	3
Wisconsin	54	54	68	90	78	54	54	29	2	(1)	(1)	8	8	4	2	1	(1)	1	1	2
Delaware	52	63	82	80	80	87	72	39	2	4	5	6	3	3	3	4	3	2	2	2
Nebraska	38	55	57	56	55	64	132	145	6	3	16	17	21	21	18	14	9	12	4	4
Other States	230	273	238	265	324	451	698	666	40	43	143	110	56	52	47	41	37	33	30	34
Total	6,821	7,156	6,543	6,894	6,818	7,048	7,288	7,129	394	371	821	1,061	999	837	668	526	444	380	293	335

PHILADELPHIA

Illinois	274	312	304	264	189	110	124	113	12	2	3	10	11	13	11	12	10	5	6	18
Missouri	152	147	134	131	260	221	183	167	10	3	17	15	16	20	21	20	17	11	6	11
Indiana	149	125	103	98	113	129	60	56	1	(1)	4	10	10	11	7	2	2	3	3	3
Ohio	149	100	103	129	100	96	54	51	3	(1)	3	7	9	10	8	5	1	1	2	2
Pennsylvania	147	174	155	133	109	97	273	274	19	18	39	47	46	32	23	15	11	5	7	12
Michigan	145	163	148	123	113	95	61	57	3	(1)	1	15	7	8	5	6	3	3	3	3
Virginia	144	149	153	120	99	129	125	108	5	9	25	24	16	6	9	6	3	2	1	2
Iowa	71	80	106	109	105	127	128	126	4	(1)	2	21	19	16	17	15	19	9	2	2
Maryland	68	66	58	55	38	35	38	43	2	3	14	10	5	2	2	1	1	1	1	1
Minnesota	63	75	84	113	104	151	196	218	13	3	11	18	24	25	22	32	29	21	12	8
Tennessee	61	25	12	27	15	59	22	15	1	1	3	3	4	1	------	(1)	(1)	2	(1)	(1)
Kansas	48	70	45	43	68	60	91	71	5	1	7	3	11	7	11	5	6	5	4	6
Delaware	46	53	46	35	23	16	49	51	3	4	8	10	9	6	4	2	1	1	1	2
Wisconsin	29	34	34	37	53	46	38	52	2	2	2	9	10	7	7	5	3	1	2	2
West Virginia	27	26	21	17	9	13	6	5	1	1	1	1	1	(1)	(1)	(1)	(1)	(1)	(1)	(1)
New York	17	35	26	29	19	6	24	41	9	4	(1)	1	2	------	1	7	(1)	6	4	7
Nebraska	15	36	15	17	46	30	29	34	6	2	7	1	2	5	4	1	3	1	1	1
Other States	98	57	48	92	103	129	234	215	19	23	22	29	18	12	4	9	22	17	19	21
Total	1,703	1,727	1,595	1,572	1,566	1,549	1,735	1,697	118	76	169	234	220	181	156	143	131	94	74	101

[1] Not over 500 cases.

TABLE 482.—*Eggs: Receipts by State of origin, 1922–1929*—Continued

SAN FRANCISCO

State of origin	1922	1923	1924	1925	1926	1927	1928	1929 Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
California	824	825	737	686	710	705	710	737	66	63	81	83	77	63	60	50	46	48	48	52
Oregon	7	13	10	37	16	19	23	18	1	------	1	1	2	1	5	2	1	1	1	2
Washington	6	10	6	11	6	17	6	4	(1)	------	------	------	------	(1)	1	1	2	------	(1)	------
Idaho	1	6	3	6	10	6	13	3	(1)	------	------	1	1	------	(1)	1	(1)	------	------	------
Other States	------	1	4	3	2	3	4	4	------	------	------	1	(1)	1	1	1	(1)	(1)	------	------
Total	838	855	760	743	744	750	756	766	67	63	82	86	80	65	67	55	49	49	49	54

LOS ANGELES

State of origin	1922	1923	1924	1925	1926	1927	1928	1929 Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
California	------	------	------	456	446	409	604	641	47	45	79	92	83	66	59	46	32	34	29	29
Idaho	------	------	------	62	56	22	10	31	(1)	------	1	5	6	10	3	4	1	1	(1)	(1)
Oregon	------	------	------	24	19	6	7	18	1	(1)	2	1	1	3	------	2	(1)	4	3	1
Utah	------	------	------	16	26	19	4	20	1	(1)	1	3	4	3	4	2	1	1	(1)	(1)
Other States	------	------	------	17	13	4	8	25	2	(1)	------	3	6	1	2	1	5	4	1	------
Total	------	------	------	575	560	460	633	735	51	45	83	104	100	83	68	55	39	44	33	30

Bureau of Agricultural Economics. Compiled from reports of bureau representatives in the various markets. Reported in cases of 30 dozen.

[1] Not over 500 cases.

TABLE 483.—*Case eggs:*[1] *Cold-storage holdings, United States, 1915–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 cases	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*	*1,000 cases*
1915								5, 029	5, 683	5, 019	3, 687	2, 788
1916	1, 508	458	35	264	2, 327	4, 593	5, 574	6, 060	5, 600	4, 868	3, 985	2, 146
1917	920	149	7	190	2, 105	4, 922	6, 617	6, 895	6, 436	5, 837	4, 638	2, 948
1918	1, 300	200	20	344	2, 957	5, 499	6, 554	6, 568	6, 265	5, 369	3, 812	2, 071
1919	740	130	26	320	3, 278	6, 098	7, 659	7, 850	7, 685	6, 858	5, 087	3, 341
1920	1, 542	342	29	122	2, 135	5, 143	6, 747	6, 872	6, 372	5, 295	3, 838	1, 824
1921	408	43	43	1, 926	4, 909	6, 844	7, 534	7, 605	7, 210	6, 269	4, 380	2, 403
1922	889	179	13	950	4, 648	8, 056	9, 811	10, 161	9, 608	7, 924	5, 726	3, 257
1923	1, 311	213	13	453	3, 737	7, 890	10, 222	10, 509	9, 883	8, 737	6, 645	4, 028
1924	1, 927	500	44	579	3, 563	6, 875	8, 685	9, 267	8, 778	7, 409	5, 267	3, 102
1925	1, 050	81	21	1, 240	4, 872	7, 712	9, 482	10, 024	9, 873	8, 612	6, 322	3, 786
1926	1, 683	578	77	872	3, 735	7, 236	9, 133	9, 845	9, 573	8, 048	5, 888	3, 215
1927	1, 096	253	92	1, 868	5, 501	8, 962	10, 565	10, 746	9, 650	7, 960	5, 485	2, 956
1928	882	26	66	1, 087	4, 515	8, 168	10, 002	10, 496	9, 944	8, 542	6, 247	3, 542
1929	1, 415	248	11	559	3, 952	6, 705	8, 510	8, 962	8, 547	7, 195	4, 930	2, 631

Bureau of Agricultural Economics. Compiled from reports from cold-storage establishments.

[1] 30-dozen cases.

TABLE 484.—*Frozen eggs:*[1] *Cold-storage holdings, United States, 1916–1929*

Year	Jan. 1	Feb. 1	Mar. 1	Apr. 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
	1,000 lbs.	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 bls.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
1916					3, 133	4, 176	5, 410	5, 822	5, 223	6, 457	6, 307	5, 104
1917	2, 737	1, 724	1, 334	2, 394	3, 329	7, 558	13, 398	15, 384	19, 741	17, 585	16, 424	13, 979
1918	14, 603	12, 207	9, 746	9, 001	9, 488	11, 555	12, 895	15, 240	15, 871	14, 757	13, 281	11, 832
1919	8, 980	7, 760	6, 931	5, 989	8, 046	11, 568	16, 472	19, 024	21, 017	20, 687	18, 976	22, 690
1920	19, 286	16, 394	13, 836	11, 039	10, 529	13, 939	17, 388	20, 055	21, 901	23, 584	20, 461	29, 945
1921	27, 325	24, 927	22, 363	20, 873	21, 730	26, 822	27, 737	27, 952	27, 408	26, 656	26, 114	22, 899
1922	19, 260	16, 209	13, 193	10, 473	14, 154	18, 273	23, 528	27, 855	34, 516	33, 545	30, 523	26, 233
1923	22, 787	18, 517	14, 603	10, 311	12, 921	20, 730	29, 686	36, 192	37, 280	43, 836	40, 424	36, 004
1924	32, 087	27, 682	23, 106	20, 736	23, 707	29, 956	33, 565	35, 184	34, 128	31, 006	26, 633	22, 100
1925	21, 303	16, 292	11, 364	11, 353	19, 579	29, 544	38, 379	42, 855	47, 099	44, 299	45, 314	39, 336
1926	33, 905	29, 256	24, 167	21, 849	25, 739	34, 815	45, 688	51, 810	52, 634	51, 062	44, 966	38, 620
1927	33, 593	31, 207	26, 053	33, 272	52, 053	71, 605	81, 263	81, 418	77, 508	71, 208	62, 066	54, 703
1928	47, 020	38, 575	31, 362	34, 411	51, 532	67, 941	77, 744	81, 670	89, 196	82, 255	73, 327	64, 201
1929	56, 181	48, 055	38, 250	34, 918	51, 825	71, 560	84, 766	91, 488	86, 693	81, 541	70, 331	61, 772

Bureau of Agricultural Economics. Compiled from reports from cold storage establishments.

[1] Quantities given are net weight.

TABLE 485.—*Eggs in the shell: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*
China	270	25, 542	0	65, 376	0	63, 230	0	50, 235	0	52, 059
Denmark	2, 243	34, 340	473	67, 225	192	69, 351	284	70, 405	153	65, 750
Netherlands	19, 542	29, 360	8, 447	71, 063	9, 620	86, 414	10, 502	103, 614	11, 376	111, 145
Irish Free State	0	0	611	43, 592	440	43, 662	372	49, 462	547	50, 465
Poland	0	0	1, 302	39, 787	82	86, 076	184	96, 400	601	80, 190
United States	[1] 1, 701	12, 108	609	24, 999	298	26, 634	250	28, 707	286	20, 192
Italy	4, 104	33, 482	6, 872	44, 612	10, 226	31, 535	22, 379	20, 700	26, 589	17, 676
Morocco	-------	[2] 5, 653	0	15, 654	0	15, 614	0	11, 983	0	-------
Belgium	19, 148	11, 521	2, 909	18, 003	790	32, 969	994	39, 956	915	57, 083
Egypt	[1] 101	9, 690	11	13, 174	1	8, 939	0	9, 197	14	10, 625
Hungary	[3] 91,561	[3] 177,163	310	21, 010	234	24, 749	302	20, 933	410	12, 999
Bulgaria	55	16, 512	0	16, 219	0	17, 391	0	18, 335	0	15, 650
Rumania	18	12, 323	0	15, 891	1	16, 683	-------	-------	-------	-------
Lithuania	0	0	0	5, 415	0	5, 787	0	5, 349	0	5, 388
Algeria	86	187	1	4, 835	2	7, 010	-------	4, 702	-------	5, 762
Union of South Africa	1, 382	[4] 90	184	2, 592	62	2, 609	126	3, 446	145	3, 644
Sweden	4, 207	3, 781	933	1, 153	1, 560	2, 619	215	5, 485	334	5, 432
Estonia	0	0	0	1, 096	0	884	0	1, 340	10	1, 960
Finland	2, 899	3	54	114	23	83	17	26	-------	-------
Norway	387	4	127	1, 129	126	452	84	98	102	178
Russia	18, 081	274, 891	-------	87, 248	-------	43, 808	-------	102, 186	-------	141, 419
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	190, 015	0	216, 828	713	220, 741	500	243, 012	965	264, 674	-------
Germany	228, 279	675	203, 045	1, 547	196, 852	182	225, 118	286	245, 649	685
Japan	6, 867	0	28, 822	0	25, 462	0	21, 700	0	16, 140	0
Spain	7, 404	618	19, 048	15	25, 318	20	-------	-------	-------	-------
Switzerland	19, 747	48	17, 337	10	17, 198	10	16, 159	12	16, 964	17
France	37, 215	8, 920	7, 382	5, 168	7, 337	17, 020	9, 435	15, 863	15, 199	59, 691
Austria	0	0	16, 460	0	22, 315	1, 732	24, 780	2, 002	25, 692	1, 727
Cuba	4, 732	0	11, 937	0	11, 774	0	11, 220	0	-------	-------
Philippine Islands	4, 315	0	5, 754	0	4, 942	0	5, 728	0	6, 016	0
Mexico	[2] 824	0	5, 188	1	-------	-------	5, 009	-------	3, 903	-------
Canada	6, 341	148	2, 722	2, 466	3, 560	1, 777	3, 227	448	997	988
Argentina	2, 351	0	6, 321	3, 585	8, 477	1, 475	10, 976	977	-------	1, 073
Czechoslovakia	0	0	1, 944	495	4, 032	1, 437	4, 287	3, 287	7, 205	1, 999
Total 34 countries	673, 875	657, 059	565, 631	574, 187	571, 665	610, 652	616, 360	666, 399	643, 921	723, 797

Bureau of Agricultural Economics. Official sources, unless otherwise specified. In countries reporting other than dozens of eggs, the conversion factor used is 1½ lbs. equals one dozen.

[1] 1 year only. [2] 2-year average. [3] Average for Austria-Hungary. [4] 4-year average.

TABLE 486.—*Eggs, not in the shell: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928 preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*
China	0	17, 217	0	133, 895	0	132, 471	0	100, 856	0	126, 803
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	-------	-------	53, 599	913	65, 235	613	70, 058	466	65, 372	-------
United States	[1] 394	([2])	33, 987	301	25, 738	522	15, 341	661	23, 474	508
Germany	11, 214	3, 225	13, 958	1, 989	14, 559	2, 157	17, 836	1, 544	19, 362	2, 385
France	3, 297	851	5, 061	276	5, 893	124	4, 978	175	10, 583	144
Netherlands	0	0	4, 304	917	3, 882	665	3, 970	862	4, 133	1, 064
Italy	381	4	1, 291	19	1, 318	0	953	27	1, 484	28
Canada	([2])	([2])	1, 507	0	1, 379	0	2, 025	0	3, 030	0
Irish Free State	-------	-------	1, 091	19	1, 022	22	1, 090	37	883	13
Belgium	-------	-------	980	100	795	112	1, 110	85	1, 185	188
Sweden	[3] 255	0	804	2	758	20	674	0	828	1
Denmark	526	[4] 6	780	16	569	3	461	6	-------	-------
Czechoslovakia	0	0	737	5	568	23	14	2	0	0
Union of South Africa	([2])	([2])	122	16	71	62	40	5	24	0
Norway	174	0	8	0	12	0	6	0	-------	0
Total 15 countries	16, 241	21, 303	118, 229	138, 468	121, 799	136, 794	118, 556	104, 726	130, 358	131, 134

Bureau of Agricultural Economics. Compiled from official sources.

[1] 4-year average. [2] Stated in value only. [3] 2-year average. [4] 3-year average.

TABLE 487.—*Eggs: Estimated average price per dozen, received by producers, United States, 1910–1929*

Year beginning April—	Apr. 15	May 15	June 15	July 15	Aug. 15	Sept. 15	Oct. 15	Nov. 15	Dec. 15	Jan. 15	Feb. 15	Mar. 15	Weighted average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	18. 6	18. 4	18. 2	17. 9	18. 5	20. 9	23. 8	27. 2	29. 7	26. 2	19. 2	15. 7	19. 3
1911	14. 8	14. 6	14. 4	14. 8	16. 4	18. 7	21. 8	26. 1	29. 1	29. 3	26. 8	21. 2	18. 2
1912	17. 4	16. 9	16. 7	17. 0	18. 2	20. 6	24. 0	27. 8	28. 2	24. 8	21. 1	17. 9	18. 9
1913	15. 9	16. 5	16. 8	16. 4	17. 7	21. 3	26. 0	31. 3	32. 9	29. 8	25. 3	22. 2	19. 8
1914	16. 4	16. 9	17. 2	17. 5	19. 1	22. 5	23. 7	28. 2	31. 9	31. 7	23. 7	16. 5	19. 3
1915	16. 6	16. 5	16. 1	16. 3	17. 3	20. 6	24. 6	29. 4	31. 1	28. 8	24. 2	18. 2	19. 0
1916	17. 7	18. 5	18. 9	19. 9	21. 6	25. 3	30. 4	34. 9	38. 3	38. 1	35. 7	25. 3	23. 3
1917	28. 5	30. 2	29. 9	29. 0	30. 5	35. 8	38. 5	41. 2	45. 9	48. 9	45. 8	30. 9	33. 0
1918	30. 4	30. 6	29. 5	33. 0	35. 2	39. 1	44. 9	51. 7	59. 3	55. 3	34. 8	33. 9	34. 9
1919	36. 0	38. 9	36. 1	37. 9	40. 6	43. 1	51. 0	59. 1	69. 6	60. 9	48. 5	40. 5	41. 8
1920	36. 6	37. 5	35. 9	37. 8	42. 5	48. 6	54. 6	62. 9	67. 1	54. 5	31. 0	26. 8	39. 3
1921	20. 5	19. 4	20. 1	24. 3	28. 9	30. 9	39. 4	50. 0	51. 1	31. 7	31. 4	19. 5	25. 3
1922	20. 0	20. 9	20. 2	20. 3	20. 6	27. 3	34. 6	43. 6	47. 2	37. 8	29. 9	25. 4	24. 7
1923	21. 6	21. 8	20. 9	21. 3	23. 6	29. 8	34. 6	45. 6	45. 5	35. 4	33. 6	20. 4	25. 2
1924	19. 1	19. 8	21. 1	22. 8	26. 1	31. 8	38. 2	45. 8	49. 9	48. 6	35. 7	23. 9	26. 1
1925	24. 2	24. 8	26. 1	27. 9	30. 0	31. 1	37. 7	46. 8	48. 1	36. 3	28. 9	24. 1	28. 3
1926	24. 8	25. 2	25. 7	25. 7	26. 4	31. 5	36. 8	44. 9	47. 6	36. 9	29. 0	20. 8	27. 5
1927	20. 3	19. 8	17. 8	20. 7	23. 4	29. 4	35. 6	41. 6	43. 3	38. 2	29. 1	23. 4	24. 2
1928	22. 8	24. 2	23. 9	25. 6	27. 4	31. 4	34. 9	39. 6	42. 9	33. 0	31. 9	28. 0	27. 4
1929	23. 0	24. 4	26. 1	27. 2	29. 8	33. 9	38. 4	44. 2	45. 8	------	------	------	---------

Bureau of Agricultural Economics. Based on returns from special price reporters. Monthly prices weighted by production eggs, 1919 census, by States; yearly price obtained by weighting monthly prices by receipts monthly.

TABLE 488.—*Eggs: Average price per dozen at specified cities*

FRESH FIRSTS AT NEW YORK

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1910	38	27	23	22	21	20	18	21	24	26	31	34	25
1911	28	19	17	17	17	15	17	18	21	24	32	35	22
1912	34	36	22	20	19	19	20	21	24	26	31	29	25
1913	24	22	19	19	20	19	19	23	27	29	39	36	25
1914	33	29	26	20	20	21	21	24	26	27	35	38	27
1915	38	26	20	21	20	20	20	22	26	30	35	34	26
1916	31	26	22	22	22	23	25	29	33	34	41	46	30
1917	46	45	31	34	35	33	34	38	41	41	49	57	40
1918	65	58	38	35	35	36	41	43	47	53	65	67	49
1919	62	44	44	43	46	44	46	48	51	62	69	79	53
1920	71	59	48	44	44	43	47	51	57	64	77	78	57
1921	67	42	31	27	25	27	33	35	39	49	58	54	41
1922	41	38	25	26	27	25	24	26	39	43	53	53	35
1923	42	37	31	27	27	24	25	29	35	39	53	47	35
1924	42	39	25	24	25	27	29	33	39	44	52	57	36
1925	59	44	30	29	32	33	33	33	37	43	56	51	40
1926	38	31	29	32	31	30	29	31	38	40	50	48	36
1927	42	32	25	26	23	23	25	28	34	40	44	45	32
1928	45	32	29	28	30	29	30	31	33	32	37	37	33
1929	36	41	33	28	31	31	32	34	36	40	48	51	37

FRESH FIRSTS AT CHICAGO

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1926	36	29	27	29	29	28	27	29	36	40	48	44	34
1927	38	27	24	23	22	22	23	26	33	37	42	43	30
1928	43	29	27	27	28	28	28	30	32	34	41	39	32
1929	36	38	29	26	30	29	31	33	37	42	47	48	35

WESTERN FIRSTS AT BOSTON

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1926	39	31	29	31	31	30	29	30	37	40	50	50	36
1927	41	31	26	25	24	23	25	28	34	39	44	44	32
1928	46	35	29	29	30	30	30	32	34	36	44	43	35
1929	38	43	32	28	31	31	32	35	37	40	49	52	37

WESTERN EXTRA FIRSTS AT PHILADELPHIA

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1926	41	36	30	32	33	34	32	34	42	47	60	52	39
1927	43	33	27	26	26	25	28	33	40	48	55	50	36
1928	50	37	30	30	32	32	33	36	39	42	50	45	38
1929	41	45	35	29	33	34	36	39	44	49	56	58	41

FRESH EXTRAS AT SAN FRANCISCO

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1926 [1]	34	27	26	29	28	31	33	37	43	50	49	44	36
1927 [2]	33	25	23	24	24	24	26	32	39	47	44	38	32
1928	33	24	25	25	26	29	30	33	39	44	45	38	33
1929	31	26	25	26	31	32	37	41	44	52	49	44	36

Bureau of Agricultural Economics. Prices 1910–1922 are averages of daily prices in New York Journal of Commerce, Price Current and Chicago Dairy Produce, Philadelphia Commercial List; average of weekly prices quoted in Boston Chamber of Commerce and Pacific Dairy Review. Beginning 1923, monthly prices from the Bureau of Labor Statistics, except San Francisco, which is from the Pacific Dairy Review. Earlier data are available in 1925 Yearbook, p. 1224, Table 636, and 1927 Yearbook, p. 1105.

[1] Year 1926 are prices as quoted by the San Francisco Mercantile Exchange in the Pacific Dairy Review not subject to discount.

[2] Beginning January, 1927, prices furnished by the Bureau of Agricultural Economics to the Pacific Dairy Review, for United States No. 1 extras.

TABLE 489.—*Chickens: Estimated number and value on hand January 1, 1920–1929*

Geographic division and year	Chickens on hand Jan. 1: Number of fowls	Price per fowl	Total value	Geographic division and year	Chickens on hand Jan. 1: Number of fowls	Price per fowl	Total value
	Thousands	*Cents*	*1,000 dollars*		*Thousands*	*Cents*	*1,000 dollars*
North Atlantic:				South Atlantic—Con.			
1920 (census)	33, 256	138. 28	45, 988	1925	42, 271	81. 95	34, 641
1921	33, 588	133. 72	44, 914	1926	42, 095	88. 10	37, 085
1922	39, 906	117. 12	46, 738	1927	45, 023	89. 02	40, 081
1923	42, 899	112. 56	48, 287	1928	47, 722	84. 50	40, 323
1924	46, 586	116. 09	54, 080	1929	42, 583	86. 96	37, 030
1925	44, 077	118. 16	52, 046	South Central:			
1926	44, 817	126. 45	56, 669	1920 (census)	74, 011	84. 82	62, 777
1927	46, 164	125. 12	57, 760	1921	70, 275	75. 32	52, 931
1928	47, 711	122. 80	58, 587	1922	80, 631	66. 24	53, 410
1929	46, 240	129. 27	59, 776	1923	76, 193	61. 58	46, 920
East North Central:				1924	88, 492	61. 77	54, 662
1920 (census)	84, 516	96. 02	81, 154	1925	81, 086	65. 26	52, 916
1921	80, 260	88. 05	70, 669	1926	81, 155	71. 29	57, 858
1922	88, 709	79. 12	70, 187	1927	99, 125	67. 18	66, 592
1923	95, 467	73. 36	70, 035	1928	93, 801	70. 45	66, 085
1924	98, 949	79. 02	78, 190	1929	87, 434	73. 38	64, 161
1925	91, 289	85. 33	77, 901	Far Western:			
1926	93, 932	95. 42	89, 628	1920 (census)	25, 999	115. 41	30, 005
1927	98, 775	96. 30	95, 125	1921	25, 994	108. 95	28, 320
1928	99, 129	90. 83	90, 037	1922	31, 973	100. 29	32, 066
1929	96, 634	98. 36	95, 054	1923	34, 572	88. 75	30, 683
West North Central:				1924	36, 842	81. 65	30, 081
1920 (census)	105, 348	89. 51	94, 293	1925	34, 557	81. 73	28, 244
1921	108, 559	81. 45	88, 421	1926	36, 035	93. 38	33, 648
1922	114, 883	75. 81	87, 093	1927	39, 331	100. 94	39, 700
1923	121, 206	64. 89	78, 651	1928	41, 873	90. 85	38, 042
1924	132, 587	66. 37	87, 995	1929	39, 147	93. 09	36, 440
1925	124, 475	68. 39	85, 123	United States:			
1926	126, 193	80. 05	101, 012	1920 (census)	359, 537	97. 21	349, 509
1927	129, 947	83. 94	109, 076	1921	356, 168	89. 30	318, 058
1928	130, 628	79. 14	103, 377	1922	396, 507	80. 77	320, 259
1929	129, 693	86. 53	112, 229	1923	411, 469	74. 61	306, 998
South Atlantic:				1924	449, 188	76. 09	341, 765
1920 (census)	36, 408	96. 94	35, 292	1925	417, 755	79. 20	330, 871
1921	37, 492	86. 96	32, 603	1926	424, 227	88. 61	375, 900
1922	40, 405	75. 61	30, 550	1927	448, 365	91. 07	408, 334
1923	41, 132	77. 55	31, 898	1928	460, 864	86. 02	396, 451
1924	45, 732	80. 37	36, 757	1929	441, 731	91. 61	404, 690

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TABLE 490.—*Chickens: Estimated number and value on farms, January 1, 1924–1929*

State and division	Number chickens Jan. 1						Value per head						Total value					
	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929	1924	1925	1926	1927	1928	1929
	Thousands	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	2,127	1,957	1,957	1,898	2,020	1,908	125	125	132	132	136	140	2,659	2,446	2,583	2,505	2,747	2,671
New Hampshire	1,293	1,267	1,267	1,242	1,336	1,271	145	140	148	153	150	150	1,875	1,774	1,875	1,900	2,004	1,906
Vermont	1,054	970	970	999	1,040	978	122	122	130	132	130	130	1,286	1,183	1,261	1,319	1,352	1,271
Massachusetts	2,071	2,030	2,030	1,949	2,027	1,991	160	150	165	155	160	160	3,314	3,045	3,350	3,021	3,243	3,186
Rhode Island	361	361	361	383	412	391	165	160	170	160	160	157	596	578	614	613	659	614
Connecticut	1,752	1,699	1,784	1,820	1,961	2,059	145	145	155	150	155	155	2,540	2,464	2,765	2,730	3,040	3,191
New York	14,835	13,945	13,945	14,224	14,366	13,980	114	112	121	120	117	123	16,912	15,618	16,873	17,069	16,808	17,195
New Jersey	4,512	4,196	4,322	4,538	4,674	4,628	140	140	149	146	130	145	6,317	5,874	6,440	6,625	6,076	6,711
Pennsylvania	18,581	17,652	18,181	19,111	19,875	19,034	100	108	115	115	114	121	18,581	19,064	20,908	21,978	22,658	23,031
North Atlantic	46,586	44,077	44,817	46,164	47,711	46,240	116.09	118.16	126.45	125.12	122.80	129.27	54,080	52,046	56,669	57,760	58,587	59,776
Ohio	22,707	21,345	22,643	23,549	23,887	23,185	85	89	100	100	93	97	19,301	18,997	22,643	23,549	22,215	22,489
Indiana	19,462	17,710	17,356	18,310	17,821	17,331	75	82	94	95	89	95	14,596	14,522	16,315	17,394	15,861	16,464
Illinois	28,566	25,995	26,514	27,575	27,479	27,148	80	85	96	96	91	101	22,853	22,096	25,453	26,472	25,006	27,419
Michigan	14,083	12,956	13,605	14,422	15,143	14,503	81	90	96	98	92	103	11,407	11,660	13,061	14,134	13,932	14,938
Wisconsin	14,131	13,283	13,814	14,919	14,799	14,467	71	80	88	91	88	95	10,033	10,626	12,156	13,576	13,023	13,744
East North Central	98,949	91,289	93,932	98,775	99,129	96,634	79.02	85.33	95.42	96.30	90.83	98.36	78,190	77,901	89,628	95,125	90,037	95,054
Minnesota	17,433	16,736	17,087	17,276	16,789	17,411	60	70	77	80	73	79	10,460	11,715	13,157	13,821	12,256	13,755
Iowa	32,554	30,275	31,183	31,806	32,340	32,005	73	78	89	90	84	90	23,764	23,614	27,753	28,625	27,166	28,804
Missouri	31,984	28,786	29,937	31,733	31,733	30,603	72	70	81	85	85	95	23,028	20,150	24,249	26,973	26,973	29,073
North Dakota	5,508	5,233	5,442	5,263	5,158	5,322	54	58	70	71	70	77	2,974	3,035	3,809	3,737	3,611	4,098
South Dakota	8,405	7,985	8,065	8,226	8,449	8,472	65	62	73	82	74	83	5,463	4,951	5,887	6,745	6,252	7,032
Nebraska	14,203	13,635	13,090	13,613	13,787	13,471	62	58	74	80	75	84	8,806	7,908	9,687	10,890	10,340	11,316
Kansas	22,500	21,825	21,389	22,030	22,372	22,409	60	63	77	83	75	81	13,500	13,750	16,470	18,285	16,779	18,151
West North Central	132,587	124,475	126,193	129,947	130,628	129,693	66.37	68.39	80.05	83.94	79.14	86.53	87,995	85,123	101,012	109,076	103,377	112,229
North Central	231,536	215,764	220,125	228,722	229,757	226,327	71.78	75.56	86.61	89.28	84.18	91.59	166,185	163,024	190,640	204,201	193,414	207,283

Delaware	1,547	1,392	1,392	1,434	1,462	1,389	100	100	115	120	105	109	1,547	1,392	1,601	1,721	1,535	1,514
Maryland	4,804	4,324	4,454	4,721	4,762	4,511	93	95	113	112	100	104	4,468	4,108	5,033	5,288	4,762	4,691
Virginia	10,451	9,406	9,594	10,361	10,896	9,879	83	83	90	92	91	95	8,674	7,807	8,635	9,532	9,915	9,385
West Virginia	4,929	4,436	4,436	4,569	4,747	4,643	82	83	95	92	90	92	4,042	3,682	4,214	4,203	4,272	4,272
North Carolina	9,570	8,900	8,900	9,345	10,116	8,675	77	78	80	81	81	82	7,369	6,942	7,120	7,569	8,194	7,114
South Carolina	4,644	4,365	4,103	4,513	4,827	4,138	73	73	73	78	73	72	3,390	3,186	2,995	3,520	3,524	2,979
Georgia	7,478	7,254	7,066	7,632	8,245	7,054	70	75	74	76	71	72	5,235	5,440	5,229	5,800	5,854	5,079
Florida	2,309	2,194	2,150	2,448	2,667	2,294	88	95	105	100	85	87	2,032	2,084	2,258	2,448	2,267	1,996
South Atlantic	45,732	42,271	42,095	45,023	47,722	42,583	80.37	81.95	88.10	89.02	84.50	86.96	36,757	34,641	37,085	40,081	40,323	37,030
Kentucky	12,508	11,257	11,483	12,401	12,539	11,063	65	69	74	80	77	82	8,130	7,767	8,497	9,921	9,655	9,072
Tennessee	13,425	12,217	12,584	13,339	14,156	12,712	63	68	73	77	73	75	8,458	8,308	9,186	10,271	10,334	9,534
Alabama	7,192	6,473	6,473	6,862	7,090	6,237	65	65	67	70	67	70	4,675	4,207	4,337	4,803	4,750	4,366
Mississippi	6,817	6,135	6,503	7,023	7,171	6,584	69	70	70	71	70	72	4,704	4,294	4,552	4,986	5,020	4,740
Arkansas	8,548	7,522	7,898	8,530	8,871	8,401	58	58	67	67	62	68	4,958	4,363	5,292	5,715	5,500	5,713
Louisiana	4,514	4,063	4,063	4,724	4,289	4,307	76	67	77	76	77	81	3,431	2,722	3,129	3,590	3,303	3,489
Oklahoma	13,836	13,283	13,626	15,107	15,561	15,457	56	63	74	80	73	78	7,748	8,368	10,083	12,086	11,360	12,056
Texas	21,652	20,136	18,525	21,139	24,124	22,673	58	64	69	72	67	67	12,558	12,887	12,782	15,220	16,163	15,191
South Central	88,492	81,086	81,155	99,125	93,801	87,434	61.77	65.26	71.29	67.18	70.45	73.38	54,662	52,916	57,858	66,592	66,085	64,161
Montana	2,797	2,545	2,596	2,466	2,676	2,863	62	70	71	80	83	84	1,734	1,782	1,843	1,973	2,221	2,405
Idaho	2,200	2,090	2,194	2,414	2,562	2,728	56	61	70	75	73	79	1,232	1,275	1,536	1,810	1,870	2,155
Wyoming	899	809	793	828	953	930	62	70	73	80	80	82	557	566	579	662	762	763
Colorado	4,078	3,752	3,902	4,214	4,288	4,502	66	67	73	78	74	75	2,691	2,514	2,848	3,287	3,173	3,376
New Mexico	1,072	965	888	977	1,119	1,101	67	68	75	81	74	76	718	656	666	791	828	837
Arizona	595	655	720	864	735	676	88	90	100	95	95	100	524	590	720	821	698	676
Utah	1,436	1,436	1,405	1,642	1,806	1,700	68	66	76	75	75	81	976	948	1,068	1,232	1,354	1,377
Nevada	260	234	251	271	288	286	90	77	90	90	95	100	234	180	226	244	274	286
Washington	5,691	5,577	6,134	7,054	7,513	6,862	82	80	95	105	90	95	4,667	4,462	5,827	7,407	6,762	6,450
Oregon	3,501	3,326	3,326	3,392	3,591	3,729	90	93	94	95	91	95	3,151	2,761	3,126	3,222	3,268	3,542
California	14,313	13,168	13,826	15,209	16,342	13,770	95	95	110	120	103	109	13,597	12,510	15,209	18,251	16,832	14,573
Far Western	36,842	34,557	36,035	39,331	41,873	39,147	81.65	81.73	93.38	100.94	90.85	93.09	30,081	28,244	33,648	39,700	38,042	36,440
United States	449,188	417,755	424,227	448,365	460,864	441,731	76.09	79.20	88.61	91.07	86.02	91.61	341,765	330,871	375,900	408,334	396,451	404,690

Bureau of Agricultural Economics.

FOREIGN TRADE OF THE UNITED STATES IN AGRICULTURAL PRODUCTS

TABLE 491.—*Summary of exports and imports, United States, 1909–1929*

Year ended June 30—	Total exports	Agricultural exports[1]			Total imports	Agricultural imports[1]	Percentage of total	Excess of agricultural exports	Forest products			
		Domestic	Percentage of total	Reexports					Exports: Domestic	Exports: Reexports	Imports	Excess of imports
	1,000 dollars	*1,000 dollars*	*Per cent*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*Per cent*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1909	1,638,356	903,238	55.1	12,779	1,311,920	701,780	53.5	214,237	72,442	1,789	60,753	[3] 13,478
1910	1,710,084	871,158	50.9	22,162	1,556,947	791,372	50.8	101,948	85,030	2,110	75,009	[3] 12,131
1911	2,013,549	1,030,794	51.2	20,573	1,527,226	770,781	50.5	280,586	103,039	1,679	71,736	[3] 32,982
1912	2,170,320	1,050,627	48.4	17,171	1,653,265	886,399	53.6	181,399	108,122	1,350	69,581	[3] 39,891
1913	2,428,506	1,123,652	46.3	19,652	1,813,008	912,925	50.4	230,379	124,836	2,809	82,878	[3] 44,767
1914	2,329,684	1,113,974	47.8	20,286	1,893,926	998,346	52.7	135,914	106,979	1,961	81,162	[3] 27,778
1915	2,716,178	1,475,938	54.3	38,222	1,674,170	997,184	59.6	510,976	52,554	1,287	79,451	25,610
1916	4,272,178	1,518,071	35.5	45,017	2,197,884	1,348,291	61.3	214,797	68,155	1,435	94,265	24,675
1917	6,227,164	1,968,253	31.6	45,420	2,659,355	1,598,091	60.1	415,582	68,919	3,392	129,580	57,269
1918	5,838,652	2,280,466	39.1	44,210	2,945,655	1,825,417	62.0	499,259	87,181	1,409	128,490	39,900
1919	7,081,462	3,579,918	50.6	105,587	3,095,720	1,929,384	62.3	1,756,121	113,275	3,758	132,588	15,555
1920	7,949,309	3,861,511	48.6	128,191	5,238,352	3,408,977	65.1	580,725	190,049	5,380	229,092	33,663
1921	6,385,884	2,607,641	40.8	90,740	3,654,459	2,059,816	56.4	638,565	141,876	4,043	225,162	79,243
1922	3,699,909	1,915,866	51.8	43,587	2,608,079	1,371,510	52.6	587,943	94,115	2,316	156,844	60,413
1923	3,886,682	1,799,168	46.3	48,393	3,780,959	2,076,371	54.9	[3] 228,810	129,981	1,945	234,599	102,673
1924	4,223,973	1,867,098	44.2	62,719	3,554,037	1,874,622	52.7	55,195	162,374	1,563	216,711	52,774
1925	4,778,155	2,280,381	47.7	64,168	3,824,128	2,056,619	53.8	287,930	156,187	1,291	227,423	69,945
1926	4,653,148	1,891,739	40.7	75,162	4,464,872	2,528,213	56.6	[2] 561,312	162,731	1,450	238,545	74,364
1927	4,867,346	1,907,864	39.2	72,169	4,252,024	2,280,340	53.6	[2] 300,307	171,970	1,365	238,247	64,912
1928	4,773,332	1,815,451	38.0	73,391	4,147,499	2,193,091	52.9	[2] 304,249	174,599	1,528	215,874	39,747
1929, preliminary	5,284,144	1,847,567	35.0	63,942	4,291,866	2,178,470	50.8	[2] 266,961	180,893	2,157	222,259	39,209

Bureau of Agricultural Economics. This table supercedes Table No. 472 in the Yearbook of Agriculture, 1927; the value of total imports and exports has been given and the imports of "rubber and similar gums" have been deducted from "imports of forest products" and added to "imports agricultural." Also reexports of "rubber and similar gums" have been deducted from "reexports of forest products" and added to "reexports agricultural."

[1] Does not include forest proudcts.

[2] Excess of agricultural imports.

[3] Excess of exports

TABLE 492.—*Agricultural products: Value of principal groups exported from and imported into the United States, 1927–1929*

Article	Year ended June 30					
	Domestic exports			Imports		
	1927	1928	1929 preliminary	1927	1928	1929 preliminary
ANIMALS AND ANIMAL PRODUCTS	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Animals, live	5,949	6,700	6,058	17,630	26,198	29,634
Dairy products	17,523	17,043	17,668	42,100	37,748	37,764
Eggs and egg products	7,901	6,534	5,145	7,592	3,710	8,130
Hides and skins, raw (except fur)	11,754	11,243	9,112	95,052	146,423	131,781
Meats and meat products	203,431	178,782	187,871	17,636	23,044	30,654
Silk, unmanufactured				421,393	382,469	393,648
Wool and mohair, unmanufactured	146	172	107	83,683	79,443	86,520
Animal products, miscellaneous	13,927	13,608	13,890	38,090	37,739	40,863
Total animals and animal products	260,631	234,082	239,851	723,176	736,774	758,994
VEGETABLE PRODUCTS						
Chocolate and cocoa	596	596	606	52,268	57,398	45,771
Coffee	7,863	4,540	2,625	293,429	297,852	308,268
Cotton lint, unmanufactured	860,079	813,401	861,098	37,206	44,803	56,437
Linters	6,845	7,136	7,120			
Total cotton, unmanufactured	866,924	820,537	868,218	37,206	44,803	56,437
Fruits	128,053	112,129	149,347	54,141	56,414	56,504
Grains and grain products	406,382	404,041	335,438	28,480	34,616	37,026
Nuts	1,667	1,524	1,528	33,079	29,472	31,198
Oilseeds and oilseed products	40,882	42,116	40,703	158,163	143,862	188,277
Rubber and similar gums				374,907	312,300	235,075
Seeds, except oilseeds	3,714	3,498	2,854	10,351	8,516	9,343
Spices	220	248	295	18,906	19,019	18,811
Sugar, molasses, and sirups	10,367	9,527	9,951	265,285	245,719	227,825
Tea				30,959	29,006	26,968
Tobacco, unmanufactured	136,075	135,970	148,115	76,672	58,804	55,803
Vegetables	20,324	21,255	23,333	38,709	39,196	39,879
Vegetable products, miscellaneous	24,166	25,525	24,703	84,609	79,340	82,291
Total vegetable products	1,647,233	1,581,369	1,607,716	1,557,164	1,456,317	1,419,476
Total animal and vegetable products	1,907,864	1,815,451	1,847,567	2,280,340	2,193,091	2,178,470
FOREST PRODUCTS						
Dyeing and tanning materials	1,939	2,716	2,414	8,967	9,728	8,020
Gums, resins, and balsams	38,279	29,685	28,701	31,878	31,595	35,977
Wood	125,955	136,685	141,417	103,613	87,531	86,211
Forest products, miscellaneous	5,797	5,514	8,361	93,789	87,020	92,051
Total forest products	171,970	174,599	180,893	238,247	215,874	222,259
Total agricultural products	2,079,834	1,990,050	2,028,460	2,518,587	2,408,965	2,400,729

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1927 and 1928.
In the statistics of foreign commerce of the United States, the Philippine Islands are treated as a foreign country.
The statistics of foreign commerce include the trade of the customs districts of Alaska, Hawaii, and Porto Rico with foreign countries, but do not include the trade of these Territories with the United States.

TABLE 493.—*Agricultural products: Value of trade between Continental United States and noncontiguous Territories, 1922–1929*

Year ended June 30—	Porto Rico		Hawaii		Alaska	
	Shipments to	Shipments from	Shipments to	Shipments from	Shipments to	Shipments from
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1922	21,926	53,892	12,734	66,292	7,123	13
1923	24,080	61,801	15,976	93,313	8,297	190
1924	28,819	66,581	17,539	104,267	9,016	365
1925	29,710	70,190	17,954	97,430	9,774	415
1926	32,212	70,385	17,806	105,470	9,539	516
1927	32,603	84,061	18,019	98,600	8,737	592
1928	28,146	82,326	19,005	110,338	9,435	175
1929, preliminary	31,468	53,328	19,335	103,653	9,108	137

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1923–1929.

TABLE 494.—*Index numbers of United States agricultural exports, 1910–1929*

[Base 1910–1914=100]

Year ended June 30—	All commodities	All commodities except cotton	Cotton fiber	Grains and products	Cattle and meat products	Dairy products	Fruits
1910	78	86	73	82	91	58	76
1911	92	92	91	85	104	93	89
1912	114	100	125	78	115	126	101
1913	110	119	103	143	97	120	136
1914	106	103	108	112	92	103	98
1915	138	189	99	301	126	302	119
1916	118	184	70	237	164	479	109
1917	118	182	70	217	164	716	101
1918	101	165	53	179	197	975	63
1919	145	255	63	272	287	1,287	111
1920	134	207	80	218	185	1,275	122
1921	127	212	64	329	154	524	108
1922	137	218	76	317	153	571	105
1923	112	182	59	246	169	406	121
1924	104	153	67	143	179	451	214
1925	126	167	95	225	140	396	184
1926	106	123	93	117	114	327	211
1927	136	143	131	188	98	288	301
1928	112	138	92	188	98	263	258
1929	117	141	99	174	102	243	372

Bureau of Agricultural Economics.

TABLE 495.—*Exports and imports of selected forest products, 1909–1929*

Year ended June 30—	Domestic exports					Imports				
	Lumber		Rosin	Spirits of turpentine	Timber, hewn and sawed	Camphor, crude	Lumber		Shellac	Wood pulp
	Boards, deals, and planks	Staves					Boards, deals, planks, and other sawed	Shingles		
	1,000 M feet	*Thousands*	*1,000 barrels*	*1,000 gallons*	*1,000 M feet*	*1,000 pounds*	*1,000 M feet*	*1,000 M*	*1,000 pounds*	*1,000 L. tons*
1909	1,358	52,583	2,170	17,502	419	1,990	846	1,058	19,185	274
1910	1,684	49,784	2,144	15,588	491	3,007	1,054	763	29,402	378
1911	2,032	65,726	2,190	14,818	532	3,726	872	643	15,495	492
1912	2,307	64,163	2,474	19,599	438	2,155	905	515	18,746	478
1913	2,550	89,006	2,806	21,094	512	3,709	1,091	560	21,912	502
1914	2,405	77,151	2,418	18,901	441	3,477	929	895	16,720	508
1915	1,129	39,297	1,372	9,464	174	3,729	939	1,487	24,153	588
1916	1,177	57,538	1,571	9,310	201	4,574	1,218	1,769	25,818	507
1917	1,042	61,469	1,639	8,842	184	6,885	1,175	1,924	32,540	699
1918	1,068	63,207	1,071	5,095	106	3,638	1,283	1,878	22,913	504
1919	1,073	62,753	882	8,065	92	2,623	977	1,757	14,269	475
1920	1,518	80,791	1,322	7,461	234	4,026	1,492	2,152	34,151	727
1921	1,269	65,710	877	9,742	123	2,093	920	1,831	23,872	624
1922	1,543	35,162	786	10,786	268	1,592	1,124	2,190	30,768	902
1923	1,549	57,466	1,040	9,012	383	3,498	1,958	2,695	32,773	1,293
1924	1,867	60,868	1,205	11,194	815	1,955	1,786	2,417	28,512	1,188
1925	1,929	79,922	1,412	12,308	586	1,904	1,732	2,551	21,436	1,529
1926	1,985	75,534	1,073	10,254	652	2,616	1,869	2,482	26,188	1,469
1927	2,013	74,826	1,229	13,820	707	2,175	1,841	2,275	28,707	1,509
1928	2,318	78,466	1,300	14,332	825	2,704	1,529	2,034	23,012	1,521
1929, preliminary	2,393	80,767	1,309	14,175	707	5,064	1,441	2,052	31,548	1,643

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1909–1918, and Monthly Summary of Foreign Commerce of the United States, June issues, 1920–1929.

TABLE 496.—*Exports of selected domestic agricultural products, averages 1900–1909, annual 1909–1929*

Year ended June 30—	Butter	Cheese	Milk, condensed and evaporated	Eggs in the shell	Pork and its products, total [1]	Pork, fresh	Pork, pickled	Bacon, including Cumberland sides	Hams and shoulders, including Wiltshire sides	Lard
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 dozen*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average:										
1900–1904	15, 425	31, 552	(2)	3, 125	1, 305, 217	28, 090	119, 050	361, 686	209, 954	576, 414
1905–1909	12, 484	11, 849	(2)	5, 439	1, 248, 682	13, 157	125, 799	271, 929	208, 230	622, 299
1909	5, 981	6, 823	(2)	5, 207	1, 053, 142	9, 555	52, 355	244, 579	212, 170	528, 723
1910	3, 141	2, 847	13, 311	5, 326	707, 110	1, 040	40, 032	152, 163	146, 885	362, 928
1911	4, 878	10, 367	12, 180	8, 559	879, 455	1, 355	45, 729	156, 675	57, 709	476, 108
1912	6, 092	6, 338	20, 643	15, 406	1, 071, 952	2, 598	56, 321	208, 574	204, 044	532, 256
1913	3, 586	2, 599	16, 526	20, 409	984, 697	2, 458	53, 749	200, 994	159, 545	519, 025
1914	3, 694	2, 428	16, 209	16, 149	921, 913	2, 668	45, 543	193, 964	165, 882	481, 458
1915	9, 851	55, 363	37, 236	20, 784	1, 106, 180	3, 908	45, 656	346, 718	203, 701	475, 532
1916	13, 487	44, 394	159, 578	26, 396	1, 462, 697	63, 006	63, 461	579, 809	282, 209	427, 011
1917	26, 835	66, 050	259, 141	24, 926	1, 501, 948	50, 436	46, 993	667, 152	266, 657	444, 770
1918	17, 736	44, 303	528, 759	18, 969	1, 692, 124	21, 390	33, 222	815, 294	419, 572	392, 506
1919	33, 740	18, 792	728, 741	28, 385	2, 704, 694	19, 644	31, 504	1, 238, 247	667, 240	724, 771
1920	27, 156	19, 378	708, 463	38, 327	1, 762, 611	27, 225	41, 643	803, 667	275, 456	587, 225
1921	7, 829	10, 826	262, 668	26, 960	1, 522, 162	57, 075	33, 286	489, 298	172, 012	746, 157
1922	7, 512	7, 471	277, 311	33, 762	1, 516, 320	25, 911	33, 510	350, 549	271, 642	812, 379
1923	9, 410	8, 446	157, 038	34, 284	1, 794, 880	43, 772	40, 934	408, 334	319, 269	952, 642
1924	5, 425	3, 938	213, 613	32, 832	1, 934, 189	49, 113	37, 469	423, 500	381, 564	1, 014, 898
1925	8, 384	9, 432	173, 547	25, 107	1, 400, 149	27, 603	26, 726	236, 263	292, 214	792, 735
1926	5, 280	4, 094	135, 865	27, 931	1, 172, 685	15, 867	29, 126	186, 153	220, 014	695, 445
1927	5, 048	3, 773	108, 942	27, 962	1, 012, 668	10, 881	27, 962	127, 576	143, 649	675, 812
1928	3, 965	2, 873	108, 943	22, 832	1, 046, 306	11, 059	31, 650	126, 977	127, 819	716, 398
1929, preliminary	3, 778	2, 572	112, 459	15, 982	1, 112, 526	10, 641	39, 906	129, 408	125, 396	780, 914

Year ended June 30—	Beef and its products, total [3]	Oleo oil	Cotton lint [4]	Linters [4]	Cottonseed cake and meal	Linseed cake and meal	Prunes	Raisins	Apples, fresh	Oranges	Sugar, raw and refined [5]
	1,000 pounds	*1,000 pounds*	*1,000 bales*	*1,000 bales*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 barrels*	*1,000 boxes*	*1,000 sh. tons*
Average:											
1900–1904	636, 969	147, 626	6, 669	------	1, 074, 720	552, 190	39, 767	3, 314	1, 109	(2)	6
1905–1909	599, 332	188, 550	8, 303	------	1, 173, 349	684, 450	35, 003	6, 856	1, 239	(2)	16
1909	418, 844	179, 985	8, 896	------	1, 233, 750	682, 765	22, 602	7, 880	896	867	40
1910	286, 296	126, 092	6, 413	------	640, 089	652, 317	89, 015	8, 526	922	932	63
1911	265, 924	138, 697	8, 068	------	804, 597	559, 675	51, 031	18, 660	1, 721	1, 179	28
1912	233, 925	126, 467	11, 070	------	1, 293, 690	596, 115	74, 328	19, 949	1, 456	1, 197	40
1913	170, 208	92, 850	9, 125	------	1, 128, 092	838, 120	117, 951	28, 121	2, 150	1, 063	22
1914	151, 212	97, 017	9, 522	------	799, 974	662, 869	69, 814	14, 766	1, 507	1, 559	26
1915	394, 981	80, 482	8, 581	226	1, 479, 065	524, 794	43, 479	24, 845	2, 352	1, 759	275
1916	457, 556	102, 646	5, 917	251	1, 057, 222	640, 916	57, 423	75, 015	1, 466	1, 575	815
1917	423, 674	67, 110	5, 702	474	1, 150, 160	536, 984	59, 645	51, 993	1, 740	1, 850	625
1918	600, 132	56, 603	4, 455	186	44, 681	151, 400	32, 927	54, 988	635	1, 240	288
1919	591, 302	59, 292	5, 442	84	311, 624	202, 788	59, 072	84, 150	1, 576	1, 402	558
1920	368, 002	74, 529	7, 035	52	449, 573	336, 336	114, 066	86, 857	1, 051	1, 619	722
1921	203, 815	106, 415	5, 570	53	454, 701	391, 264	57, 461	24, 492	2, 665	2, 001	292
1922	222, 462	117, 174	6, 592	126	532, 721	484, 059	109, 398	49, 639	1, 094	1, 641	1, 001
1923	194, 912	104, 956	5, 205	48	454, 350	574, 612	79, 229	93, 962	1, 756	1, 799	375
1924	185, 372	92, 965	5, 784	115	250, 366	560, 114	136, 448	88, 152	4, 09[illegible]	2, 592	135
1925	190, 211	105, 145	8, 239	200	885, 375	691, 126	171, 771	90, 783	3, 201	2, 197	251
1926	152, 320	90, 410	8, 110	102	716, 505	589, 166	151, 405	135, 027	3, 672	2, 253	300
1927	151, 531	92, 720	11, 281	278	990, 516	625, 121	175, 544	152, 337	7, 098	3, 340	114
1928	106, 595	64, 851	7, 890	230	664, 523	606, 304	260, 625	193, 099	3, 144	2, 988	106
1929, preliminary	101, 334	63, 187	8, 520	219	751, 200	645, 120	273, 051	221, 801	7, 014	4, 223	128

Footnotes at end of table.

TABLE 496.—*Exports of selected domestic agricultural products, averages 1900–1909, annual 1909–1929*—Continued

Year ended June 30—	Barley, including flour, and malt [6]	Corn, including corn meal	Oats, including oatmeal	Rice, including flour, meal, and broken rice	Rye, including flour	Wheat, including flour	Tobacco, unmanufactured [7]	Glucose and grape sugar	Hops	Starch, including cornstarch
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 bushels*	*1,000 bushels*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average:										
1900–1904	11, 931	111, 484	22, 188	3, 511	2, 734	196, 690	328, 321	167, 108	11, 420	68, 173
1905–1909	9, 907	77, 857	13, 614	17, 009	1, 186	116, 181	321, 197	151, 690	15, 613	52, 143
1909	6, 729	37, 665	2, 334	1, 567	1, 296	116, 373	287, 901	112, 225	10, 447	33, 228
1910	4, 454	38, 128	2, 549	7, 050	242	89, 173	357, 196	149, 820	10, 589	51, 536
1911	9, 507	65, 615	3, 846	15, 575	40	71, 338	355, 327	181, 963	13, 105	158, 239
1912	1, 655	41, 797	2, 678	26, 798	31	81, 891	379, 845	171, 156	12, 191	83, 645
1913	17, 874	50, 780	36, 455	24, 801	1, 855	145, 159	418, 797	200, 149	17, 591	110, 898
1914	6, 945	10, 726	2, 749	18, 223	2, 273	147, 955	449, 750	199, 531	24, 263	76, 714
1915	28, 712	50, 668	100, 609	75, 449	13, 027	335, 702	348, 346	158, 463	16, 210	107, 037
1916	30, 821	39, 897	98, 960	120, 695	15, 250	246, 221	443, 293	186, 406	22, 410	210, 185
1917	20, 319	66, 753	95, 106	181, 372	13, 703	205, 962	411, 599	214, 973	4, 825	146, 424
1918	28, 717	49, 073	125, 091	196, 363	17, 186	132, 579	289, 171	97, 858	3, 495	73, 883
1919	26, 997	23, 019	109, 005	193, 128	36, 467	287, 402	629, 288	136, 230	7, 467	143, 788
1920	34, 555	16, 729	43, 436	483, 385	41, 531	222, 030	648, 038	245, 264	30, 780	237, 609
1921	27, 255	70, 906	9, 391	440, 855	47, 337	369, 313	506, 526	141, 954	22, 206	135, 365
1922	27, 543	179, 490	21, 237	541, 509	29, 944	282, 566	463, 389	273, 982	19, 522	386, 873
1923	21, 909	96, 596	25, 413	370, 670	51, 663	224, 900	454, 364	162, 693	13, 497	260, 796
1924	13, 913	23, 135	8, 796	227, 757	19, 902	159, 880	597, 630	148, 051	20, 461	262, 842
1925	28, 543	9, 791	16, 777	112, 037	50, 242	260, 803	430, 702	139, 577	16, 122	214, 247
1926	30, 449	24, 783	39, 687	48, 175	12, 647	108, 035	537, 240	170, 142	14, 998	224, 569
1927	19, 655	19, 819	15, 041	304, 358	21, 697	219, 160	516, 401	148, 789	13, 369	233, 111
1928	39, 274	19, 409	9, 823	309, 788	26, 346	206, 259	489, 996	145, 951	11, 812	281, 388
1929, preliminary	60, 295	41, 880	16, 242	392, 714	9, 488	163, 687	565, 984	123, 403	8, 836	235, 660

Year ended June 30—	Cornstarch [5]	Apples, dried	Apricots, dried	Apricots, canned [9]	Pears, canned [9]	Peaches, canned [9]	Pineapples, canned [9]	Grapes	Pears, fresh [9]	Grapefruit, fresh
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 boxes*
1913	--------	41, 575	35, 017	--------	--------	--------	--------	--------	--------	--------
1914	--------	33, 566	17, 402	--------	--------	--------	--------	--------	--------	--------
1915	--------	42, 589	23, 764	--------	--------	--------	--------	--------	--------	--------
1916	--------	16, 219	23, 940	--------	--------	--------	--------	--------	--------	--------
1917	--------	10, 358	9, 841	--------	--------	--------	--------	--------	--------	--------
1918	38, 659	2, 603	5, 230	--------	--------	--------	--------	--------	--------	--------
1919	105, 727	18, 909	20, 975	--------	--------	--------	--------	--------	--------	--------
1920	163, 315	11, 819	26, 768	--------	--------	--------	--------	--------	--------	--------
1921	110, 514	18, 053	8, 332	--------	--------	--------	--------	--------	--------	--------
1922	348, 940	12, 431	16, 736	--------	--------	--------	--------	[10]173	--------	[10]140
1923	254, 060	12, 817	11, 193	[10]13, 809	49, 358	54, 624	21, 848	14, 022	36, 785	252
1924	255, 135	30, 323	38, 777	26, 576	38, 431	50, 374	25, 238	20, 257	50, 237	305
1925	209, 865	19, 225	13, 292	31, 360	53, 851	57, 390	26, 252	20, 302	41, 452	427
1926	208, 463	24, 833	18, 132	29, 547	75, 876	83, 160	37, 543	24, 268	71, 205	379
1927	212, 375	32, 670	17, 901	35, 896	66, 104	81, 896	37, 426	30, 791	73, 877	613
1928	275, 921	21, 704	23, 684	29, 013	52, 671	86, 634	51, 227	38, 819	51, 056	719
1929, preliminary	231, 667	50, 055	24, 692	26, 249	82, 652	101, 438	47, 533	55, 638	82, 847	940

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1900-1918, and Monthly Summary of Foreign Commerce of the United States, June issues 1921-1929.

Conversion factors used: Corn meal, 1 barrel=4 bushels corn; oatmeal, 18 pounds=1 bushel oats; rye flour, 1 barrel=6 bushels rye; malt, 1.1 bushels=1 bushel barley; wheat flour, 1 barrel=1900-1908, 4.75 bushels grain; 1909-1917, 4.7 bushels; 1918 and 1919, 4.5 bushels; 1920, 4.6 bushels; 1921-1929, 4.7 bushels; apples, 3 boxes=1 barrel;.

[1] Includes canned, fresh, salted, or pickled pork, lard, neutral lard, lard oil, bacon, and hams.
[2] Reported in value only.
[3] Includes canned, cured, and fresh beef, oleo oil, oleo stock, oleomargarine, tallow, and stearin from animal fats.
[4] Bales of 500 pounds gross; lint cotton and linters not separately reported prior to 1915.
[5] Includes maple sugar, 1919-1929.
[6] Includes barley flour 1919-1922. Barley flour not separately reported prior to 1919 nor since 1922.
[7] Includes "Stems, trimmings, and scrap tobacco."
[8] Included with "Starch" prior to 1918.
[9] Given in value only prior to 1923.
[10] Jan. 1 to June 30.

Table 497.—*Imports of selected agricultural products, averages 1900–1909, annual 1909–1929*

Year ended June 30—	Butter	Cheese	Beef and veal, fresh	Cattle hides	Goatskins	Total hides and skins except furs	Silk [1]	Cotton, unmanufactured	Wool, unmanufactured, including mohair, etc.	Total tobacco, unmanufactured
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Average:										
1900–1904	192	17, 846	(2)	131, 736	83, 047	309, 360	13, 942	67, 292	155, 394	28, 216
1905–1909	532	30, 462	(3)	138, 922	95, 555	372, 292	20, 061	78, 771	209, 413	38, 688
1909	646	35, 548	(3)	192, 252	104, 048	444, 554	25, 188	86, 518	266, 409	43, 123
1910	1, 360	40, 818	(2)	318, 004	115, 845	608, 619	23, 457	86, 038	263, 928	46, 853
1911	1, 008	45, 569	(2)	150, 128	86, 914	374, 891	26, 666	113, 768	137, 648	48, 203
1912	1, 026	46, 542	(2)	251, 012	95, 341	537, 768	26, 585	109, 780	193, 401	54, 740
1913	1, 162	49, 388	(2)	268, 042	96. 250	572, 197	32, 101	121, 852	195, 293	67, 977
1914	7, 842	63. 784	180, 137	279, 963	84, 759	561, 071	34, 546	123, 347	247, 649	61, 175
1915	3, 828	50, 139	184, 491	344, 341	66, 547	538, 218	31, 053	185, 205	308, 083	45, 809
1916	713	30. 088	71, 102	434, 178	100, 657	743, 670	41, 925	232, 801	534, 828	48, 078
1917	524	14, 482	15, 217	386, 600	105, 640	700, 207	40, 351	147, 062	372, 372	49, 105
1918	1, 806	9, 839	25, 452	267, 500	66, 933	432, 517	43, 681	103, 326	379, 130	86, 991
1919	4, 131	2, 442	36, 670	253, 877	89, 005	448, 142	50, 069	103, 592	422, 415	83, 951
1920	20, 771	17, 914	42, 436	439, 461	126, 996	798, 569	58, 410	345, 314	427, 578	94, 005
1921	34, 344	16, 585	41, 956	198, 573	41, 728	352, 193	34, 778	125, 939	318, 236	58, 923
1922	9, 551	34, 271	28, 001	204, 936	83, 535	392, 904	57, 437	179, 165	255, 087	65, 225
1923	15, 772	54, 555	32, 481	405, 383	89, 401	682, 893	63, 188	236, 092	525, 473	75, 786
1924	29, 466	66, 597	25, 144	176, 475	65, 881	365, 194	56, 595	146, 024	239, 122	54, 497
1925	7, 189	61, 489	12, 419	199, 310	65, 956	387, 447	70, 270	155, 092	284, 706	76, 870
1926	6, 440	62, 412	18, 279	155, 587	86, 484	355, 266	76, 838	161, 454	345, 512	69, 974
1927	10, 710	89, 782	22, 098	156, 938	83, 571	368, 876	85, 162	190, 963	271, 128	92, 983
1928	4. 955	75, 424	47. 650	307, 362	84, 751	532, 379	87, 128	175, 450	248, 035	81, 045
1929, preliminary	3, 298	84, 606	62, 481	216. 371	94, 476	447, 369	90, 807	227, 454	270, 936	79, 284

Year ended June 30—	Rubber and similar gums, crude, total	Coffee	Tea	Cocoa or cacao beans	Bananas	Olives	Lemons	Onions	Beans, dry
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bunches*	*1,000 gallons*	*1,000 boxes*	*1,000 bushels*	*1,000 bushels*
Average:									
1900–1904	66, 973	928, 799	94, 342	54, 936	(3)	(3)	2, 153	843	1, 002
1905–1909	95, 054	965, 058	98, 353	91, 774	[4] 36, 988	[5] 2, 796	2, 025	941	1, 270
1909	114, 599	1, 049, 869	114, 917	129, 855	36, 974	2, 969	1, 827	575	3, 355
1910	154. 621	871, 470	85, 626	108, 668	38, 157	4, 555	2, 165	1, 024	1, 015
1911	145, 744	875, 367	102, 564	138, 058	44, 699	3, 045	1, 824	1, 515	1, 037
1912	175, 966	885, 201	101, 407	145, 969	44, 521	5, 077	1, 968	1, 436	1, 005
1913	170, 747	863, 131	94, 813	140, 039	42, 357	3, 946	2, 046	789	1, 048
1914	161, 777	1, 001, 528	91, 131	176, 268	48, 684	5, 316	(3)	1, 115	1, 634
1915	196, 122	1, 118, 691	96, 988	192, 307	41, 092	3, 622	(3)	829	906
1916	304, 183	1, 201, 104	109, 866	243, 232	36, 755	5, 938	(3)	816	663
1917	364, 914	1, 319, 871	103, 364	338, 654	34, 661	5, 642	(3)	1, 758	3, 748
1918	414, 984	1, 143, 891	151, 315	399, 040	34, 550	2, 385	(3)	1, 313	4, 146
1919	422, 215	1, 046, 029	108, 172	313, 037	35, 382	3, 501	(3)	152	4, 016
1920	660, 610	1, 414, 228	97, 826	420, 331	36, 848	5, 206	(3)	1, 884	3, 806
1921	371, 300	1, 348, 926	72, 196	327, 123	40, 808	4, 054	(3)	689	824
1922	578, 512	1, 238, 012	86, 142	317, 124	46, 120	(3)	1, 373	2, 488	520
1923	810, 028	1, 305, 188	96, 669	381, 508	44, 504	(3)	1, 660	1, 783	2, 623
1924	633, 489	1, 429, 617	105, 443	382, 971	44, 935	6, 848	1, 018	1, 406	886
1925	824, 434	1, 279, 570	92, 779	382, 570	50, 513	5, 901	1, 264	2, 075	1, 421
1926	952, 659	1, 437, 364	99, 411	417, 060	58, 550	5, 992	1, 247	2, 194	1, 271
1927	993, 272	1, 444, 847	97, 402	425, 184	57, 102	5, 212	659	2, 298	1, 051
1928	959, 245	1, 535, 392	90, 099	411, 543	64, 029	6, 458	1, 308	1, 399	2, 465
1929, preliminary	1,252,130	1, 435, 070	92, 635	419, 243	63, 530	6, 955	391	2, 050	1, 505

Footnotes at end of table.

TABLE 497.—*Imports of selected agricultural products, averages 1900–1909, annual 1909–1929*—Continued

Year ended June 30—	Almonds in terms of shelled [6]	Peanuts in terms of shelled [6]	Walnuts in terms of shelled [6]	Coconut meat [7]	Flaxseed	Sugar, raw and refined	Molasses	Jute and jute butts, unmanufactured	Manila or abaca	Sisal and henequen
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 bushels*	*1,000 short tons*	*1,000 gallons*	*1,000 long tons*	*1,000 long tons*	*1,000 long tons*
Average:										
1900–1904	7,862	(8)	[4] 18,017	(8)	504	1,894	13,788	102	54	87
1905–1909	13,832	(8)	26,849	[5] 15,010	218	1,961	20,221	114	58	98
1909	11,029	(8)	26,158	23,843	594	2,095	22,093	157	62	91
1910	18,556	29,276	33,641	21,306	5,002	2,047	31,292	68	93	100
1911	15,523	18,834	33,619	37,817	10,499	1,969	23,838	65	74	118
1912	17,231	11,248	37,214	69,912	6,842	2,052	28,828	101	69	114
1913	13,856	14,989	17,213	40,870	5,294	2,370	33,927	125	74	154
1914	15,027	38,726	20,800	55,735	8,653	2,533	51,410	106	50	216
1915	13,679	19,338	20,490	96,485	10,666	2,710	70,840	83	51	186
1916	14,546	25,407	23,733	118,613	14,679	2,817	85,717	108	79	229
1917	19,916	32,385	23,839	256,801	12,394	2,666	110,238	113	77	143
1918	20,845	75,463	16,252	507,576	13,367	2,452	130,731	78	86	150
1919	25,615	20,425	9,057	315,749	8,427	2,918	130,075	53	68	153
1920	28,533	128,390	28,961	258,229	23,392	3,798	154,670	77	77	176
1921	15,861	46,202	15,902	213,134	16,170	3,506	113,414	90	52	159
1922	28,036	9,678	35,174	294,104	13,632	4,232	87,908	62	44	72
1923	24,345	45,013	25,970	338,597	25,006	4,367	161,135	85	98	98
1924	24,207	50,683	26,428	344,920	19,577	3,765	174,037	84	98	97
1925	22,503	93,191	36,623	371,961	13,419	4,337	215,778	56	73	146
1926	19,686	36,026	31,698	444,278	19,354	4,420	256,246	71	62	126
1927	15,890	49,792	31,776	507,136	24,224	4,420	260,259	89	61	116
1928	18,496	63,783	20,347	518,173	18,112	4,045	248,427	81	48	124
1929, preliminary	18,678	30,412	24,500	687,121	23,437	4,752	296,550	92	60	135

Year ended June 30—	Milk and cream, fresh	Cream, fresh	Eggs, whole, in the shell	Eggs and egg yolks, dried, frozen, or prepared	Whole eggs, dried	Whole eggs, frozen	Yolks, dried	Yolks, frozen	Egg albumen, dried	Egg albumen, frozen, prepared and preserved	Hair of the Angora (mohair)
	1,000 gallons	*1,000 gallons*	*1,000 dozen*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1913	(2)	1,247	1,367	228	------	------	------	------	(2)	------	------
1914	(2)	1,773	6,015	3,420	------	------	------	------	(2)	------	------
1915	(2)	2,077	3,047	8,572	------	------	------	------	(2)	------	------
1916	(2)	1,194	733	6,022	------	------	------	------	(2)	------	------
1917	(2)	744	1,110	10,318	------	------	------	------	(2)	------	------
1918	(2)	712	1,619	14,598	------	------	------	------	(2)	------	------
1919	2,592	(2)	848	9,085	------	------	------	------	(2)	------	------
1920	3,989	(2)	1,348	24,091	------	------	------	------	(2)	------	------
1921	4,391	(2)	3,316	28,768	------	------	------	------	(2)	------	------
1922	4,536	(2)	1,224	16,540	------	------	------	------	7,388	------	------
1923	5,148	(2)	535	14,821	------	------	------	------	3,213	------	[9] 7,220
1924	6,623	[10] 1,646	426	[11] 14,830	[10] 544	[10] 1,106	[10] 522	[10] 1,210	6,642	[10] 636	3,583
1925	6,418	4,765	682	------	1,884	8,751	4,281	4,151	3,257	1,106	2,404
1926	7,479	4,798	276	------	1,365	12,647	6,004	5,662	4,490	5,119	6,463
1927	6,106	5,273	296	------	1,132	8,114	4,468	4,601	3,859	3,967	6,547
1928	5,425	4,819	256	------	575	611	3,486	1,229	2,361	553	2,204
1929, preliminary	5,016	3,173	291	------	2,133	12,616	5,130	4,581	2,898	610	3,134

Bureau of Agricultural Economics. Compiled from Commerce and Navigation of the United States, 1900–1918, and Monthly Summary of Foreign Commerce, June issue, 1919–1929.

[1] Includes "Silk, raw or as reeled from cocoon," "Silk waste," and "Silk cocoons."
[2] Not separately classified.
[3] Reported in value only.
[4] 2-year average.
[5] 3-year average.
[6] Conversion factors used: Almonds, 30 per cent unshelled equals shelled. Peanuts, 3 pounds unshelled equals 2 pounds shelled. Walnuts, 42 per cent unshelled equals shelled.
[7] Includes broken, or shredded, desiccated or prepared and copra.
[8] Included with "All other nuts."
[9] Beginning Sept. 22, 1922.
[10] Beginning Jan. 1, 1924.
[11] July 1–Dec. 31, 1923.

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*

Article and country to which exported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
ANIMALS AND ANIMAL PRODUCTS								
Butter:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	5,280	5,048	3,965	3,778	100.0	100.0	100.0	100.0
Mexico	1,015	859	724	672	19.2	17.0	18.3	18.0
Cuba	782	734	479	370	14.8	14.5	12.1	9.8
Panama	719	582	311	227	13.6	11.5	7.8	6.0
Haitian Republic	585	498	479	479	11.1	9.9	12.1	12.7
Other West Indies [1]	479	550	391	394	9.1	10.9	9.9	10.4
Peru	424	356	358	451	8.0	7.1	9.0	11.9
Other South America	384	605	390	485	7.3	12.0	9.8	12.8
Philippine Islands	230	187	190	152	4.4	3.7	4.8	4.0
Other countries	662	677	643	548	12.5	13.4	16.2	14.4
Cheese:								
Total	4,094	3,773	2,873	2,572	100.0	100.0	100.0	100.0
Canada	216	350	259	170	5.3	9.3	9.0	6.6
Cuba	910	832	359	405	22.2	22.1	12.5	15.7
Other West Indies [1]	600	479	331	360	14.7	12.7	11.5	14.0
Mexico	940	670	581	423	23.0	17.8	20.2	16.4
Panama	403	434	432	460	9.8	11.5	15.0	17.9
Other Central America	278	284	293	294	6.8	7.5	10.2	11.4
China	233	252	145	89	5.7	6.7	5.0	3.5
Other countries	514	472	473	371	12.5	12.4	16.6	14.5
Milk:								
Condensed—								
Total	42,656	35,799	36,975	39,598	100.0	100.0	100.0	100.0
Total Europe	479	424	151	70	1.1	1.2	.4	.2
Cuba	16,337	12,843	11,462	13,103	38.3	35.9	31.0	33.1
Philippine Islands	7,767	6,471	7,575	7,339	18.2	18.1	20.5	18.5
Japan, including Chosen	4,744	4,029	5,385	5,473	11.1	11.3	14.6	13.8
China	3,811	3,621	2,513	2,840	8.9	10.1	6.8	7.2
Hongkong	1,992	2,065	3,764	3,739	4.7	5.8	10.2	9.4
Mexico	1,285	1,308	985	883	3.0	3.7	2.7	2.2
Other countries	6,241	5,038	5,140	6,151	14.7	13.9	13.8	15.6
Evaporated—								
Total	93,210	73,143	71,968	72,861	100.0	100.0	100.0	100.0
Total Europe	52,147	30,527	24,401	22,267	55.9	41.7	33.9	30.6
Germany	19,306	1,851	16	71	20.7	2.5	.0	.1
United Kingdom	29,181	27,418	23,805	21,759	31.3	37.5	33.1	29.9
Belgium	427	280	389	265	.5	.4	.5	.4
Other Europe	3,233	972	191	172	3.4	1.3	.3	.2
Philippine Islands	12,902	12,806	15,563	16,372	13.8	17.5	21.6	22.5
Peru	3,737	4,215	3,569	3,994	4.0	5.8	5.0	5.5
Panama	3,597	4,127	3,589	4,606	3.9	5.6	5.0	6.3
Cuba	2,942	2,958	2,647	2,272	3.2	4.0	3.7	3.1
China	3,227	3,025	3,035	3,447	3.5	4.1	4.2	4.7
Mexico	3,293	2,714	2,157	2,185	3.5	3.7	3.0	3.0
British Malaya	1,853	1,932	2,817	2,761	2.0	2.6	3.9	3.8
Japan	1,512	1,616	2,466	2,544	1.6	2.2	3.4	3.5
Other countries	8,000	9,223	11,724	12,413	8.6	12.8	16.3	17.0
Bacon, including Cumberland sides:								
Total	186,153	127,543	126,967	129,408	100.0	100.0	100.0	100.0
Total Europe	156,817	98,561	99,554	103,394	84.2	77.3	78.4	79.9
United Kingdom	106,909	68,220	50,127	53,524	57.4	53.5	39.5	41.4
Germany	14,043	6,818	9,838	5,982	7.5	5.3	7.7	4.6
Norway	7,050	2,422	3,244	2,742	3.8	1.9	2.6	2.1
Netherlands	6,379	2,502	632	1,198	3.4	2.0	.5	.9
Finland	3,672	4,493	6,075	4,633	2.0	3.5	4.8	3.6
Italy	3,264	1,439	8,113	15,106	1.8	1.1	6.4	11.7
Other Europe	15,500	12,667	21,525	20,209	8.3	10.0	16.9	15.6
Cuba	22,085	21,070	19,107	16,698	11.9	16.5	15.0	12.9
Canada	4,780	4,584	5,173	5,769	2.6	3.6	4.1	4.5
Other countries	2,471	3,328	3,133	3,547	1.3	2.6	2.5	2.7

See footnotes at end of table.

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
ANIMALS AND ANIMAL PRODUCTS—continued								
Hams and shoulders, including Wiltshire sides:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	220,015	143,649	127,819	125,396	100.0	100.0	100.0	100.0
Total Europe	196,592	126,266	106,526	103,986	89.4	87.9	83.3	82.9
United Kingdom	190,136	124,391	104,020	100,959	86.4	86.6	81.4	80.5
Belgium	3,929	451	660	1,004	1.8	.3	.5	.8
Other Europe	2,527	1,424	1,846	2,023	1.2	1.0	1.4	1.6
Cuba	10,553	6,548	8,167	7,320	4.8	4.6	6.4	5.8
Canada	6,099	4,803	6,134	6,309	2.8	3.3	4.8	5.0
Other countries	6,771	6,032	6,992	7,781	3.0	4.2	5.5	6.3
Pork:								
Canned—								
Total	5,947	6,731	8,614	7,965	100.0	100.0	100.0	100.0
Total Europe	5,242	5,675	7,729	6,700	88.1	84.3	89.7	84.1
United Kingdom	5,196	5,595	7,632	6,555	87.4	83.1	88.6	82.3
Other Europe	46	80	97	145	.7	1.2	1.1	1.8
Other countries	705	1,056	885	1,265	11.9	15.7	10.3	15.9
Fresh—								
Total	15,868	10,881	11,059	10,641	100.0	100.0	100.0	100.0
Total Europe	11,660	7,388	7,420	7,062	73.5	67.9	67.1	66.4
United Kingdom	10,686	7,128	6,418	4,547	67.3	65.5	58.0	42.7
Other Europe	974	260	1,002	2,515	6.2	2.4	9.1	23.7
Cuba	2,138	1,763	1,557	1,732	13.5	16.2	14.1	16.3
Canada	1,194	590	798	582	7.5	5.4	7.2	5.5
Other countries	876	1,140	1,284	1,265	5.5	10.5	11.6	11.8
Pickled—								
Total	29,126	27,962	31,650	39,906	100.0	100.0	100.0	100.0
Total Europe	5,871	4,801	7,016	10,248	20.2	17.2	22.2	25.7
United Kingdom	2,972	3,857	5,184	7,608	10.2	13.8	16.4	19.1
Norway	1,469	394	722	854	5.0	1.4	2.3	2.1
Germany	476	134	289	366	1.6	.5	.9	.9
Other Europe	954	416	821	1,420	3.4	1.5	2.6	3.6
Canada	7,889	5,800	7,056	8,596	27.1	20.7	22.3	21.5
Newfoundland and Labrador	3,580	3,532	3,734	4,530	12.3	12.6	11.8	11.4
Cuba	5,935	7,760	7,626	10,550	20.4	27.8	24.1	26.4
British West Indies and Bermudas	2,457	2,730	2,851	2,810	8.4	9.8	9.0	7.0
Haitian Republic	972	917	1,055	838	3.3	3.3	3.3	2.1
Other countries	2,422	2,422	2,312	2,334	8.3	8.6	7.3	5.9
Lard:								
Total	695,445	675,812	716,398	780,914	100.0	100.0	100.0	100.0
Total Europe	518,691	489,376	519,188	555,697	74.6	72.4	72.5	71.2
Germany	208,541	174,621	176,771	195,695	30.0	25.8	24.7	25.1
United Kingdom	218,146	222,086	233,564	229,899	31.4	32.9	32.6	29.4
Netherlands	41,479	46,071	35,784	36,992	6.0	6.8	5.0	4.7
Italy	13,891	7,642	20,384	29,200	2.0	1.1	2.8	3.7
Belgium	14,092	12,718	14,541	14,841	2.0	1.9	2.0	1.9
Other Europe	22,542	26,238	38,144	49,070	3.2	3.9	5.4	6.4
Cuba	77,377	79,599	78,469	84,316	11.1	11.8	11.0	10.8
Other countries	99,377	106,837	118,741	140,901	14.3	15.8	16.5	18.0
Lard, neutral:								
Total	20,132	20,057	23,799	18,315	100.0	100.0	100.0	100.0
Total Europe	18,641	18,283	21,809	16,553	92.6	91.2	91.6	90.4
Germany	5,519	5,895	5,623	4,023	27.4	29.4	23.6	22.0
Netherlands	4,645	5,260	6,784	4,710	23.1	26.2	28.5	25.7
United Kingdom	4,039	3,530	5,096	3,919	20.1	17.6	21.4	21.4
Norway	1,315	1,039	1,228	895	6.5	5.2	5.2	4.9
Denmark	1,001	726	1,176	894	5.0	3.6	4.9	4.9
Sweden	904	912	696	649	4.5	4.5	2.9	3.5
Other Europe	1,218	921	1,206	1,463	6.0	4.7	5.1	8.0
Other countries	1,491	1,774	1,990	1,762	7.4	8.8	8.4	9.6

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
ANIMALS AND ANIMAL PRODUCTS—continued								
Oleo oil:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	90,410	92,720	64,851	63,187	100.0	100.0	100.0	100.0
Total Europe	87,177	88,128	61,611	59,481	96.4	95.0	95.0	94.1
Netherlands	26,271	27,270	17,608	16,744	29.1	29.4	27.2	26.5
Germany	24,005	25,443	18,267	16,835	26.6	27.4	28.2	26.6
United Kingdom	17,611	18,691	16,092	16,328	19.5	20.2	24.8	25.8
Norway	5,541	5,460	3,596	2,763	6.1	5.9	5.5	4.4
Greece	5,735	3,972	454	602	6.3	4.3	.7	1.0
Other Europe	8,014	7,292	5,594	6,209	8.8	7.8	8.6	9.8
Other countries	3,233	4,592	3,240	3,706	3.6	5.0	5.0	5.9
VEGETABLE PRODUCTS								
Cotton, excluding linters:	*1,000 bales* [2]	*1,000 bales* [2]	*1,000 bales* [2]	*1,000 bales* [2]				
Total	8,110	11,281	7,890	8,520	100.0	100.0	100.0	100.0
Total Europe	6,624	8,813	6,428	6,598	81.7	78.1	81.5	77.4
United Kingdom	2,278	2,623	1,443	1,918	28.1	23.3	18.3	22.5
Germany	1,657	2,829	2,090	1,891	20.4	25.1	26.5	22.2
France	927	1,063	904	841	11.4	9.4	11.5	9.9
Italy	743	841	708	765	9.2	7.5	9.0	9.0
Other Europe	1,019	1,457	1,283	1,183	12.6	12.8	16.2	13.8
Japan	1,118	1,644	1,007	1,373	13.8	14.6	12.8	16.1
Other countries	368	824	455	549	4.5	7.3	5.7	6.5
Linters:								
Total	102	278	231	219	100.0	100.0	100.0	100.0
Total Europe	88	258	212	198	86.3	92.8	91.8	90.4
Germany	33	154	132	120	32.4	55.4	57.1	54.8
France	16	26	36	32	15.7	9.4	15.6	14.6
United Kingdom	19	51	22	16	18.6	18.3	9.5	7.3
Belgium	4	12	7	12	3.9	4.3	3.0	5.5
Other Europe	16	15	15	18	15.7	5.4	6.6	8.2
Canada	14	20	18	19	13.7	7.2	7.8	8.7
Other countries	0	0	1	2	.0	.0	.4	.9
Fruits:								
Dried—								
Apples—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	24,833	32,670	21,704	50,024	100.0	100.0	100.0	100.0
Total Europe	23,840	31,313	20,735	48,808	96.0	95.8	95.5	97.6
Germany	8,864	12,158	10,877	22,085	35.7	37.2	50.1	44.1
Netherlands	7,871	9,568	3,315	12,451	31.7	29.3	15.3	24.9
United Kingdom	1,902	2,282	1,018	2,618	7.7	7.0	4.7	5.2
Sweden	1,975	2,278	2,524	2,985	8.0	7.0	11.6	6.0
Denmark	1,053	1,371	1,384	1,674	4.2	4.2	6.4	3.3
Other Europe	2,175	3,656	1,617	6,995	8.7	11.1	7.4	14.1
Other countries	993	1,357	969	1,216	4.0	4.2	4.5	2.4
Apricots—								
Total	18,132	17,901	23,684	24,652	100.0	100.0	100.0	100.0
Total Europe	16,221	15,776	21,158	22,279	89.5	88.1	89.3	90.4
Germany	3,946	4,593	6,512	7,742	21.8	25.7	27.5	31.4
United Kingdom	2,654	2,084	1,964	1,422	14.6	11.6	8.3	5.8
Netherlands	4,063	3,316	4,651	3,750	22.4	18.5	19.6	15.2
Norway	568	945	1,260	988	3.1	5.3	5.3	4.0
Belgium	1,200	1,038	1,374	1,691	6.6	5.8	5.8	6.9
Sweden	776	952	994	776	4.3	5.3	4.2	3.1
Other Europe	3,014	2,848	4,403	5,910	16.7	15.9	18.6	24.0
Canada	1,132	1,257	1,920	1,614	6.2	7.0	8.1	6.5
Other countries	779	868	606	759	4.3	4.9	2.6	3.1

See footnotes at end of table.

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30—							
	1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Fruits—Continued.								
Dried—Continued.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Prunes—								
Total	151, 405	175, 544	260, 625	273, 051	100. 0	100. 0	100. 0	100. 0
Total Europe	125, 278	145, 710	223, 574	240, 794	82. 7	83. 0	85. 8	88. 2
Germany	18, 893	38, 553	79, 732	77, 883	12. 5	22. 0	30. 6	28. 5
United Kingdom	37, 096	40, 173	45, 601	40, 836	24. 5	22. 9	17. 5	15. 0
France	39, 146	27, 217	27, 390	59, 822	25. 9	15. 5	10. 5	21. 9
Netherlands	8, 943	10, 242	23, 140	17, 286	5. 9	5. 8	8. 9	6. 3
Sweden	4, 871	6, 854	7, 047	5, 434	3. 2	3. 9	2. 7	2. 0
Other Europe	16. 329	22, 671	40, 664	39, 533	10. 7	12. 9	15. 6	14. 5
Canada	17, 723	20, 454	23, 272	18, 965	11. 7	11. 7	8. 9	6. 9
Other countries	8, 404	9, 380	13, 779	13, 292	5. 6	5. 3	5. 3	4. 9
Raisins—								
Total	135, 027	152, 337	193, 099	221, 756	100. 0	100. 0	100. 0	100. 0
Total Europe	83, 706	97, 714	131, 925	152, 785	62. 0	64. 1	68. 3	68. 9
United Kingdom	43, 185	49, 991	70, 034	71, 375	32. 0	32. 8	36. 3	32. 2
Germany	18, 738	16, 039	18, 733	23, 022	13. 9	10. 5	9. 7	10. 4
Netherlands	13, 802	13, 857	18, 598	24, 278	10. 2	9. 1	9. 6	10. 9
Denmark	2, 107	1, 994	1. 593	2, 244	1. 6	1. 3	. 8	1. 0
Other Europe	5, 874	15, 833	22, 967	31, 866	4. 3	10. 4	11. 9	14. 4
Canada	32, 914	37, 400	40, 148	39, 635	24. 4	24. 6	20. 8	17. 9
China	4, 406	3, 549	4, 144	7, 574	3. 3	2. 3	2. 1	3. 4
Japan	2, 513	2, 801	3, 086	2, 961	1. 9	1. 8	1. 6	1. 3
Other countries	11, 488	10, 873	13, 796	18, 801	8. 4	7. 2	7. 2	8. 5
Fresh—	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*				
Apples—								
Total	1, 851	4, 483	1, 349	3, 005	100. 0	100. 0	100. 0	100. 0
Total Europe	1, 678	4, 154	1, 184	2, 786	90. 7	92. 7	87. 8	92. 7
United Kingdom	1, 477	3, 305	1, 004	1, 720	79. 8	73. 7	74. 4	57. 2
Other Europe	201	849	180	1, 066	10. 9	19. 0	13. 4	35. 5
Other countries	173	329	165	219	9. 3	7. 3	12. 2	7. 3
Apples—	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*				
Total	5, 464	7, 844	5, 384	12, 027	100. 0	100. 0	100. 0	100. 0
Total Europe	3, 993	6, 142	4, 025	10, 057	73. 1	78. 3	74. 8	83. 6
United Kingdom	2, 717	3, 723	2, 709	4, 836	49. 7	47. 5	50. 3	40. 2
Germany	577	1, 237	737	2, 695	10. 6	15. 8	13. 7	22. 4
Other Europe	699	1, 182	579	2, 526	12. 8	15. 0	10. 8	21. 0
Canada	631	730	542	636	11. 5	9. 3	10. 1	5. 3
Other countries	840	972	817	1, 334	15. 4	12. 4	15. 1	11. 1
Oranges—								
Total	2, 241	3, 340	2, 988	4, 223	100. 0	100. 0	100. 0	100. 0
Canada	1, 995	2, 636	2, 346	3, 151	89. 0	78. 9	78. 5	74. 6
United Kingdom	114	403	402	709	5. 1	12. 1	13. 5	16. 8
Other countries	132	301	240	363	5. 9	9. 0	8. 0	8. 6
Grapefruit—								
Total	379	613	719	940	100. 0	100. 0	100. 0	100. 0
Canada	227	264	349	335	59. 9	43. 1	48. 5	35. 6
United Kingdom	130	310	333	561	34. 3	50. 6	46. 3	59. 7
France	3	4	4	4	. 8	. 7	. 6	. 4
Germany	3	8	6	8	. 8	1. 3	. 8	. 9
Other countries	16	27	27	32	4. 2	4. 3	3. 8	3. 4
Canned—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	266, 673	270, 370	255, 876	329, 824	100. 0	100. 0	100. 0	100. 0
Total Europe	233, 545	232, 707	215, 795	284, 400	87. 6	86. 1	84. 3	86. 2
United Kingdom	207, 702	203, 016	177, 256	236, 754	77. 9	75. 1	69. 3	71. 8
Other Europe	25. 843	29, 691	38, 539	47, 646	9. 7	11. 0	15. 0	14. 4
Canada	11, 149	15, 491	17, 993	22, 769	4. 2	5. 7	7. 0	6. 9
Other countries	21, 979	22, 172	22, 088	22, 655	8. 2	8. 2	8. 7	6. 9

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Grains and grain products:	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Barley—								
Total	27, 181	17, 044	36, 580	56, 996	100. 0	100. 0	100. 0	100. 0
Total Europe	21, 175	14, 254	25, 607	32, 686	77. 9	83. 6	70. 0	57. 3
United Kingdom	13, 223	8, 981	10, 151	13, 161	48. 6	52. 7	27. 8	23. 1
Germany	3, 883	2, 066	11, 599	13, 085	14. 3	12. 1	31. 7	23. 0
Netherlands	922	815	2, 581	3, 909	3. 4	4. 8	7. 1	6. 9
Belgium	1, 727	1, 576	642	1, 782	6. 4	9. 2	1. 8	3. 1
Other Europe	1, 420	816	634	749	5. 2	4. 8	1. 6	1. 2
Canada	5, 755	2, 184	10, 453	23, 886	21. 2	12. 8	28. 6	41. 9
Other countries	251	606	520	424	. 9	3. 6	1. 4	. 8
Corn—								
Total	23, 137	17, 563	18, 374	40, 750	100. 0	100. 0	100. 0	100. 0
Canada	8, 071	10, 536	6, 454	11, 082	34. 9	60. 0	35. 1	27. 2
Cuba	2, 097	2, 016	1, 021	765	9. 1	11. 5	5. 6	1. 9
Mexico	4, 453	2, 124	323	572	19. 2	12. 0	1. 8	1. 4
United Kingdom	2, 378	1, 268	1, 885	8, 237	10. 3	7. 2	10. 3	20. 2
Netherlands	3, 510	560	4, 311	7, 977	15. 2	3. 2	23. 5	19. 6
Germany	742	2	2, 520	4, 353	3. 2	. 0	13. 7	10. 7
Denmark	999	563	845	896	4. 3	3. 1	4. 6	2. 2
Other countries	887	504	1, 015	6, 868	3. 8	3. 0	5. 4	16. 8
Oats—								
Total	30, 975	9, 245	6, 034	10, 848	100. 0	100. 0	100. 0	100. 0
Total Europe	16, 119	2, 532	1, 243	3, 195	52. 0	27. 4	20. 6	29. 5
Germany	2, 632	297	115	0	8. 5	3. 2	1. 9	. 0
United Kingdom	4, 563	1, 259	645	1, 177	14. 7	13. 6	10. 7	10. 8
Belgium	2, 540	352	123	257	8. 2	3. 8	2. 0	2. 4
France	4, 287	239	44	141	13. 8	2. 6	. 7	1. 3
Other Europe	2, 097	385	316	1, 620	6. 8	4. 2	5. 3	15. 0
Canada	13, 351	5, 198	3, 426	6, 501	43. 1	56. 2	56. 8	59. 9
Cuba	1, 093	1, 170	1, 028	861	3. 5	12. 7	17. 0	7. 9
Mexico	127	132	98	51	. 4	1. 4	1. 6	. 5
Other countries	285	213	239	240	1. 0	2. 3	4. 0	2. 2
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Oatmeal—								
Total	156, 805	104, 334	68, 192	97, 245	100. 0	100. 0	100. 0	100. 0
Total Europe	130, 684	74, 806	39, 749	67, 948	83. 3	71. 7	58. 3	69. 9
United Kingdom	46, 526	18, 885	14, 447	23, 775	29. 7	18. 1	21. 2	24. 4
Netherlands	31, 843	25, 930	7, 485	14, 525	20. 3	24. 9	11. 0	14. 9
Finland	17, 532	13, 219	9, 471	17, 335	11. 2	12. 7	13. 9	17. 8
Belgium	7, 057	4, 736	2, 890	3, 064	4. 5	4. 5	4. 2	3. 2
Other Europe	27, 726	12, 036	5, 456	9, 249	17. 6	11. 5	8. 0	9. 6
South America	3, 768	1, 164	9, 757	11, 389	2. 4	1. 1	14. 3	11. 7
Mexico	3, 993	4, 027	3, 739	3, 802	2. 5	3. 9	5. 5	3. 9
British India	804	850	1, 770	1, 594	. 5	. 8	2. 6	1. 6
Canada	3, 265	1, 913	3, 582	1, 556	2. 1	1. 8	5. 3	1. 6
Other countries	14, 291	21, 574	9, 595	10, 956	9. 2	20. 7	14. 0	11. 3
Rice—								
Total	27, 588	234, 548	230, 432	313, 405	100. 0	100. 0	100. 0	100. 0
Total Europe	16, 467	121, 914	133, 819	173, 117	59. 7	52. 0	58. 1	55. 2
United Kingdom	8, 071	33, 675	35, 459	41, 812	29. 3	14. 4	15. 4	13. 3
Belgium	2, 452	18, 764	12, 778	23, 167	8. 9	8. 0	5. 5	7. 4
Germany	3, 417	36, 917	35, 851	43, 799	12. 4	15. 7	15. 6	14. 0
France	273	5, 169	12, 388	16, 065	1. 0	2. 2	5. 4	5. 1
Other Europe	2, 254	27, 389	37, 343	48, 274	8. 1	11. 7	16. 2	15. 4
South America	3, 315	24, 847	41, 205	78, 819	12. 0	10. 6	17. 9	25. 1
Canada	918	7, 525	14, 227	19, 800	3. 3	3. 2	6. 2	6. 3
Central America	2, 302	3, 468	5, 888	5, 852	8. 3	1. 5	2. 6	1. 9
Japan	436	68, 518	2, 020	14, 609	1. 6	29. 2	. 9	4. 7
Other countries	4, 150	8, 276	33, 273	21, 208	15. 1	3. 5	14. 3	6. 8

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Grains and grain products—Contd.	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Rye— Total	12,505	21,613	26,064	9,346	100.0	100.0	100.0	100.0
Total Europe	5,466	7,485	5,974	3,381	43.7	34.6	22.9	36.2
Germany	1,179	1,577	1,245	364	9.4	7.3	4.8	3.9
Netherlands	1,234	1,768	1,408	868	9.9	8.2	5.4	9.3
Norway	1,499	489	298	57	12.0	2.3	1.1	.6
United Kingdom	330	2,345	1,710	1,174	2.6	10.8	6.6	12.6
Other Europe	1,224	1,306	1,313	918	9.8	6.0	5.0	9.8
Canada	7,017	14,118	20,080	5,913	56.1	65.3	77.0	63.3
Other countries	22	10	9	52	.2	.1	.1	.5
Wheat— Total	63,189	156,250	145,999	103,114	100.0	100.0	100.0	100.0
Total Europe	33,893	111,198	89,203	46,645	53.6	71.2	61.1	45.2
United Kingdom	16,335	39,341	36,574	16,276	25.9	25.2	25.1	15.8
Italy	2,877	10,407	10,450	5,047	4.6	6.7	7.2	4.9
Netherlands	3,720	17,131	11,559	5,149	5.9	11.0	7.9	5.0
Belgium	4,302	8,926	8,797	3,232	6.8	5.7	6.0	3.1
France	613	16,079	5,127	2,215	1.0	10.3	3.5	2.1
Germany	1,704	7,287	5,582	1,674	2.7	4.7	3.8	1.6
Other Europe	4,342	12,027	11,114	13,052	6.7	7.6	7.6	12.7
Canada	20,638	26,793	45,563	41,190	32.7	17.1	31.2	39.9
Japan, including Chosen	5,178	7,336	6,304	3,782	8.2	4.7	4.3	3.7
China	17	1,099	0	1,241	.0	.7	.0	1.2
Other countries	3,463	9,824	4,929	10,256	5.5	6.3	3.4	10.0
Wheat, flour—	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*				
Total	9,542	13,385	12,821	12,888	100.0	100.0	100.0	100.0
Total Europe	3,121	6,063	5,093	3,708	32.7	45.3	39.7	28.8
United Kingdom	860	1,733	1,224	886	9.0	12.9	9.5	6.9
Germany	340	834	534	312	3.6	6.2	4.2	2.4
Netherlands	774	1,568	1,530	1,084	8.1	11.7	11.9	8.4
Greece	249	282	113	49	2.6	2.1	.9	.4
Other Europe	898	1,646	1,692	1,377	9.4	12.4	13.2	10.7
Cuba	1,144	1,199	1,216	1,204	12.0	9.0	9.5	9.3
Other West Indies [1]	607	747	676	809	6.4	5.6	5.3	6.3
Brazil	864	904	873	831	9.1	6.8	6.8	6.4
Philippine Islands	596	666	727	802	6.2	5.0	5.7	6.2
Central America	561	613	697	752	5.9	4.6	5.4	5.8
Hongkong	371	618	929	868	3.9	4.6	7.2	6.7
China	489	418	790	1,242	5.1	3.1	6.2	9.6
Kwantung	266	189	136	428	2.8	1.4	1.1	3.3
Other countries	1,523	1,967	1,684	2,244	15.9	14.6	13.1	17.6
Hops—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	14,998	13,369	11,812	8,836	100.0	100.0	100.0	100.0
Total Europe	10,537	9,378	7,718	5,337	70.3	70.1	65.3	60.4
United Kingdom	4,115	4,559	6,121	4,175	27.4	34.1	51.8	47.2
Belgium	3,791	1,892	255	129	25.3	14.2	2.2	1.5
Other Europe	2,631	2,927	1,342	1,033	17.6	21.8	11.3	11.7
Canada	2,937	2,772	3,168	2,838	19.6	20.7	26.8	32.1
Other countries	1,524	1,219	926	661	10.1	9.2	7.9	7.5
Oil cake and oil-cake meal— Cottonseed cake— Total	506,582	599,448	527,023	395,257	100.0	100.0	100.0	100.0
Total Europe	505,701	585,526	526,913	395,230	99.8	97.7	100.0	100.0
Denmark	408,114	345,747	450,524	319,596	80.6	57.7	85.5	80.9
Germany	73,489	215,887	58,773	49,844	14.5	36.0	11.2	12.6
Other Europe	24,098	23,892	17,611	25,790	4.7	4.0	3.3	6.5
Other countries	881	13,922	110	27	.2	2.3	.0	.0

See footnotes at end of table.

TABLE 498.—*Destination of principal agricultural products exported from the United States, 1926–1929*—Continued

Article and country to which exported	Year ended June 30—							
	1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Grains and grain products—Contd.								
Oil cake and oil-cake meal—Con.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Cottonseed meal—								
Total	209,922	391,068	137,498	177,415	100.0	100.0	100.0	100.0
Total Europe	191,216	360,620	126,758	162,739	91.1	92.2	92.2	91.7
United Kingdom	91,867	150,699	45,844	60,084	43.8	38.5	33.3	33.9
Germany	47,013	127,687	39,157	46,312	22.4	32.7	28.5	26.1
Norway	17,768	28,746	11,655	10,192	8.5	7.4	8.5	5.7
Other Europe	34,568	53,488	30,102	46,151	16.4	13.6	21.9	26.0
Other countries	18,706	30,448	10,740	14,676	8.9	7.8	7.8	8.3
Linseed or flaxseed cake—								
Total	577,908	609,520	589,174	624,913	100.0	100.0	100.0	100.0
Total Europe	577,891	609,394	589,053	624,086	100.0	100.0	100.0	99.9
Netherlands	416,202	381,104	305,321	371,385	72.0	62.5	51.8	59.4
Belgium	125,301	171,487	235,883	204,205	21.7	28.1	40.0	32.7
United Kingdom	26,513	45,522	38,698	40,392	4.6	7.5	6.6	6.5
Other Europe	9,875	11,281	9,151	8,104	1.7	1.9	1.6	1.3
Other countries	17	126	121	827	.0	.0	.0	.1
Oils, vegetable:								
Cottonseed—								
Total	59,016	57,580	61,470	29,531	100.0	100.0	100.0	100.0
Canada	36,387	37,683	49,407	20,550	61.7	65.4	80.4	69.6
Cuba	4,869	2,770	2,033	1,836	8.3	4.8	3.3	6.2
Mexico	4,362	3,868	5,318	2,374	7.4	6.7	8.7	8.0
Germany	288	747	42	14	.5	1.3	.1	.0
Norway	1,565	2,325	131	0	2.7	4.0	.2	.0
Argentina	1,536	2,160	1,108	912	2.6	3.8	1.8	3.1
Other countries	10,009	8,027	3,431	3,845	16.8	14.0	5.5	13.1
Sugar, refined:	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*				
Total	300	114	106	128	100.0	100.0	100.0	100.0
Total Europe	217	67	61	46	72.3	58.8	57.5	35.9
United Kingdom	131	37	35	24	43.7	32.5	33.0	18.8
France	12	5	1	2	4.0	4.4	.9	1.6
Greece	7	3	2	0	2.3	2.6	1.9	.0
Norway	27	15	13	14	9.0	13.2	12.3	10.9
Other Europe	40	7	10	6	13.3	6.1	9.4	4.6
Uruguay	33	19	13	26	11.0	16.7	12.3	20.3
Canada	5	2	4	7	1.7	1.8	3.8	5.5
Newfoundland and Labrador	4	1	1	2	1.3	.9	.0	1.6
West Indies and Bermuda	5	4	5	6	1.7	3.5	4.7	4.7
British Africa	4	5	5	12	1.3	4.4	4.7	9.4
Mexico	2	4	2	5	.7	3.5	1.9	3.9
Other countries	30	12	15	24	10.0	10.4	14.2	18.7
Tobacco, leaf:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Bright flue cured—								
Total	324,363	288,671	328,924	414,366	100.0	100.0	100.0	100.0
Total Europe	176,662	163,744	192,081	211,358	54.5	56.7	58.4	51.0
United Kingdom	153,540	134,886	157,506	171,352	47.3	46.7	47.9	41.4
Germany	9,789	11,105	13,378	13,801	3.0	3.8	4.1	3.3
Other Europe	13,333	17,753	21,197	26,205	4.2	6.2	6.4	6.3
China	93,627	[2] 71,760	[2] 68,842	[2] 131,254	28.9	24.9	20.9	31.7
Australia	20,306	19,307	21,488	18,146	6.3	6.7	6.5	4.4
Canada	11,568	11,984	14,049	14,293	3.6	4.2	4.3	3.4
Japan	8,203	8,553	11,555	14,564	2.5	3.0	3.5	3.5
British India	5,599	4,538	5,031	5,884	1.7	1.6	1.5	1.4
Other countries	8,398	8,785	15,878	18,867	2.5	2.9	4.9	4.6

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce.

[1] Excludes Bermuda. [2] Includes Hong Kong and Kwantung.

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TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*

Article and country from which imported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
ANIMALS AND ANIMAL PRODUCTS								
Cattle:	*Thousands*	*Thousands*	*Thousands*	*Thousands*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	215	267	548	566	100.0	100.0	100.0	100.0
Canada	175	168	343	256	81.4	62.9	62.6	45.2
Mexico	39	99	204	309	18.1	37.1	37.2	54.6
Other countries	1	0	1	1	.5	.0	.2	.2
Butter:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	6,440	10,710	4,955	3,298	100.0	100.0	100.0	100.0
Total Europe	1,754	5,653	2,084	1,239	27.2	52.8	42.1	37.6
Denmark	873	1,529	761	902	13.6	14.3	15.4	27.3
United Kingdom	691	3,932	870	58	10.7	36.7	17.6	1.8
Other Europe	190	192	453	279	2.9	1.8	9.1	8.5
Canada	1,111	610	275	237	17.3	5.7	5.5	7.2
New Zealand	2,232	3,682	2,396	1,674	34.7	34.4	48.4	50.8
Argentina	1,147	332	11	62	17.8	3.1	.2	1.9
Other countries	196	433	189	86	3.0	4.0	3.8	2.5
Cheese:								
Total	62,412	89,782	75,424	84,606	100.0	100.0	100.0	100.0
Total Europe	61,859	72,454	63,374	73,888	99.1	80.7	84.0	87.3
Italy	33,822	36,572	31,332	38,337	54.2	40.7	41.5	45.3
Switzerland	15,487	20,638	16,449	19,731	24.8	23.0	21.8	23.3
France	5,855	4,923	5,874	6,243	9.4	5.5	7.8	7.4
Netherlands	3,056	3,687	3,736	3,525	4.9	4.1	5.0	4.2
Other Europe	3,639	6,634	5,983	6,052	5.8	7.4	7.9	7.1
Canada	164	16,609	11,439	9,381	.3	18.5	15.2	11.1
Other countries	389	719	611	1,337	.6	.8	.8	1.6
Eggs, in the shell:	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*	*1,000 dozen*				
Total	276	296	256	291	100.0	100.0	100.0	100.0
Hong Kong	189	219	199	236	68.5	74.0	77.7	81.1
China	16	6	40	28	5.8	2.0	15.6	9.6
Canada	69	54	13	13	25.0	18.2	5.1	4.5
Other countries	2	17	4	14	.7	5.8	1.6	4.8
Eggs and egg yolks (dried, frozen, and preserved):	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	25,679	18,315	5,901	24,460	100.0	100.0	100.0	100.0
China	21,928	14,825	5,409	20,582	85.4	80.9	91.7	84.1
United Kingdom	3,130	3,357	248	3,285	12.2	18.3	4.2	13.4
Other countries	621	133	244	593	2.4	.8	4.1	2.5
Egg albumen:								
Total	9,610	7,826	2,914	3,508	100.0	100.0	100.0	100.0
China	8,676	6,907	2,836	3,431	90.3	88.3	97.3	97.8
Other countries	934	919	78	77	9.7	11.7	2.7	2.2
Fibers, animal:								
Silk, raw, in skeins reeled from cocoon—								
Total	64,291	73,402	75,758	77,341	100.0	100.0	100.0	100.0
Japan	51,784	59,934	64,673	63,415	80.5	81.6	85.4	82.0
China	9,519	11,872	9,816	12,326	14.8	16.2	13.0	15.9
Other countries	2,988	1,596	1,269	1,600	4.7	2.2	1.6	2.1
Wool, unmanufactured—								
Carpet wool—								
Total	118,079	144,698	145,489	164,713	100.0	100.0	100.0	100.0
China	35,668	36,362	55,998	53,589	30.2	25.1	38.5	32.5
United Kingdom	39,153	51,602	32,423	33,861	33.2	35.7	22.3	20.6
British India	6,804	6,906	10,811	14,390	5.8	4.8	7.4	8.7
Palestine and Syria	7,691	8,064	8,420	3,953	6.5	5.6	5.8	2.4
Argentina	6,885	9,513	8,924	19,820	5.8	6.6	6.1	12.0
France	2,945	5,371	5,414	4,470	2.5	3.7	3.7	2.7
Other countries	18,933	26,880	23,499	34,630	16.0	18.5	16.2	21.1

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
ANIMALS AND ANIMAL PRODUCTS—continued								
Fibers, animal—Continued.								
Wool, unmanufactured—Contd.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Clothing wool—Total	16,663	16,770	19,374	18,407	100.0	100.0	100.0	100.0
Argentina	2,730	2,843	2,545	1,872	16.4	17.0	13.1	10.2
United Kingdom	4,152	4,775	4,169	2,499	24.9	28.5	21.5	13.6
Uruguay	1,016	497	213	1,062	6.1	3.0	1.1	5.8
Australia	4,560	3,797	5,515	5,936	27.4	22.6	28.5	32.2
Chile	728	1,186	1,677	1,625	4.4	7.1	8.7	8.8
Canada	843	2,353	2,838	1,601	5.0	14.0	14.6	8.7
Other countries	2,634	1,319	2,417	3,812	15.8	7.8	12.5	20.7
Combing wool—Total	204,032	102,908	80,282	83,478	100.0	100.0	100.0	100.0
Australia	59,531	38,714	21,992	17,906	29.2	37.6	27.4	21.4
United Kingdom	27,314	15,484	17,344	12,319	13.4	15.0	21.6	14.8
Argentina	37,292	15,265	11,424	12,875	18.3	14.8	14.2	15.4
Uruguay	37,592	17,751	6,962	20,341	18.4	17.2	8.7	24.4
New Zealand	16,442	5,192	8,260	8,577	8.0	5.0	10.3	10.3
Other countries	25,861	10,502	14,300	11,460	12.7	10.4	17.8	13.7
Hair of the Angora goat (mohair), alpaca, etc.—Total	6,738	6,752	2,890	4,338	100.0	100.0	100.0	100.0
British South Africa	2,319	2,505	660	884	34.4	37.1	22.8	20.4
United Kingdom	2,530	792	541	384	37.5	11.7	18.7	8.9
Peru	85	82	425	716	1.3	1.2	14.7	16.5
China	55	74	184	145	.8	1.1	6.4	3.3
Turkey (Europe and Asia)	1,731	3,237	983	2,034	25.7	47.9	34.0	46.9
Other countries	18	62	97	175	.3	1.0	3.4	4.0
Sausage casings: Total	19,271	18,844	19,545	22,040	100.0	100.0	100.0	100.0
Argentina	4,690	4,804	4,975	5,719	24.3	25.5	25.5	26.0
Canada	3,715	3,351	3,928	2,989	19.3	17.8	20.1	13.6
China	2,989	2,074	1,640	1,445	15.5	11.0	8.4	6.6
Australia	2,109	2,198	2,213	2,597	10.9	11.7	11.3	11.8
Uruguay	501	876	917	1,317	2.6	4.6	4.7	6.0
New Zealand	1,357	901	1,223	1,086	7.0	4.8	6.3	4.9
Germany	784	1,904	1,353	2,599	4.1	10.1	6.9	11.8
Other countries	3,126	2,736	3,296	4,288	16.3	14.5	16.8	19.3
VEGETABLE PRODUCTS								
Cocoa or cacao beans: Total	417,060	425,184	411,543	419,243	100.0	100.0	100.0	100.0
British West Africa	135,051	164,338	133,963	146,739	32.4	38.7	32.6	35.0
Brazil	86,110	81,148	100,262	87,338	20.6	19.1	24.4	20.8
Dominican Republic	49,955	51,084	39,591	50,353	12.0	12.0	9.6	12.0
British West Indies and Bermudas	46,061	31,247	38,217	41,933	11.0	7.3	9.3	10.0
Ecuador	34,385	13,710	19,210	16,939	8.2	3.2	4.7	4.0
Venezuela	15,046	13,207	14,482	18,008	3.6	3.1	3.5	4.3
Germany	11,479	15,797	29,074	17,424	2.8	3.7	7.1	4.2
Other countries	38,973	54,653	36,744	40,509	9.4	12.9	8.8	9.7
Coffee: Total	1,437,364	1,444,847	1,535,392	1,435,070	100.0	100.0	100.0	100.0
Brazil	995,957	1,000,721	1,059,742	933,056	69.3	69.3	69.0	65.0
Colombia	207,469	313,590	261,678	263,236	14.4	21.7	17.0	18.3
Central America	94,812	40,070	64,443	54,774	6.6	2.8	4.2	3.8
Other countries	139,126	90,466	149,529	184,004	9.7	6.2	9.8	12.9

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30—							
	1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Fibers, vegetable:								
Cotton, raw—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	161, 453	190, 963	175, 450	227, 454	100. 0	100. 0	100. 0	100. 0
Egypt	112, 633	102, 280	94, 581	135, 007	69. 8	53. 6	53. 9	59. 4
Mexico	11, 776	46, 550	11, 508	26, 004	7. 3	24. 4	6. 6	11. 4
China	12, 787	14, 536	32, 123	18, 554	7. 9	7. 6	18. 3	8. 2
British India	11, 123	9, 240	12, 467	25, 736	6. 9	4. 8	7. 1	11. 3
Peru	7, 469	8, 650	9, 146	8, 636	4. 6	4. 5	5. 2	3. 8
Other countries	5, 665	9, 707	15, 625	13, 517	3. 5	5. 1	8. 9	5. 9
Flax, unmanufactured—	*Long tons*	*Long tons*	*Long tons*	*Long tons*				
Total	7, 104	4, 705	5, 437	5, 650	100. 0	100. 0	100. 0	100. 0
Total Europe	6, 543	4, 294	5, 187	5, 476	92. 1	91. 3	95. 4	96. 9
United Kingdom	1, 759	1, 231	1, 800	1, 758	24. 8	26. 2	33. 1	31. 1
Belgium	630	446	739	757	8. 9	9. 5	13. 6	13. 4
Latvia	215	898	1, 520	2, 176	3. 0	19. 1	28. 0	38. 5
Russia in Europe	1, 565	642	149	294	22. 0	13. 6	2. 7	5. 2
Netherlands	439	287	253	208	6. 2	6. 1	4. 7	3. 7
Estonia	1, 126	566	113	0	15. 8	12. 0	2. 1	. 0
Other Europe	809	224	613	283	11. 4	4. 8	11. 2	5. 0
Canada	263	45	126	72	3. 7	1. 0	2. 3	1. 3
Other countries	298	366	124	102	4. 2	7. 7	2. 3	1. 8
Manila fiber—								
Total	62	61	48	60	100. 0	100. 0	100. 0	100. 0
Philippine Islands	62	60	47	60	100. 0	98. 4	97. 9	100. 0
Other countries	0	1	1	0	. 0	1. 6	2. 1	. 0
Sisal and henequen—								
Total	126	116	124	135	100. 0	100. 0	100. 0	100. 0
Mexico	96	82	93	95	76. 2	70. 7	75. 0	70. 4
Dutch East Indies	14	19	16	20	11. 1	16. 4	12. 9	14. 8
Other countries	16	15	15	20	12. 7	12. 9	12. 1	14. 8
Fruits:								
Dried—								
Currants—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	14, 773	13, 011	11, 034	9, 382	100. 0	100. 0	100. 0	100. 0
Total Europe	14, 635	12, 913	10, 856	9, 286	99. 1	99. 2	98. 4	99. 0
Greece	14, 032	12, 714	10, 800	9, 178	95. 0	97. 7	97. 9	97. 8
Other Europe	603	199	56	108	4. 1	1. 5	. 5	1. 2
Other countries	138	98	178	96	. 9	. 8	1. 6	1. 0
Dates—								
Total	70, 195	49, 434	44, 128	54, 087	100. 0	100. 0	100. 0	100. 0
Hejaz, Arabia, etc	59, 623	32, 828	694	476	84. 9	66. 4	1. 6	. 9
United Kingdom	5, 800	3, 413	6, 987	3, 085	8. 3	6. 9	15. 8	5. 7
Palestine and Syria	0	0	1	37	. 0	. 0	. 0	. 0
Iraq	[1] 942	10, 161	34, 700	45, 373	[1] 1. 3	20. 6	78. 6	83. 9
Other countries	3, 830	3, 032	1, 746	5, 116	5. 5	6. 1	4. 0	9. 5
Figs—								
Total	43, 681	39, 504	31, 459	35, 563	100. 0	100. 0	100. 0	100. 0
Turkey (Europe and Asia)	22, 419	22, 270	16, 566	22, 418	51. 3	56. 4	52. 7	63. 0
Greece	4, 615	6, 842	2, 465	4, 910	10. 6	17. 3	7. 8	13. 8
Portugal	8, 366	2, 786	5, 933	4, 404	19. 2	7. 1	18. 9	12. 4
Italy	3, 722	3, 305	1, 943	1, 358	8. 5	8. 4	6. 2	3. 8
Other countries	4, 559	4, 301	4, 552	2, 473	10. 4	10. 8	14. 4	7. 0
Fresh—								
Bananas—	*1,000 bunches*	*1,000 bunches*	*1,000 bunches*	*1,000 bunches*				
Total	58, 550	57, 102	64, 029	63, 520	100. 0	100. 0	100. 0	100. 0
Central America	34, 840	32, 208	39, 676	42, 386	59. 5	56. 4	62. 0	66. 7
Jamaica	14, 766	13, 861	13, 398	11, 712	25. 2	24. 3	20. 9	18. 4
Colombia	2, 241	2, 073	1, 695	1, 439	4. 2	3. 6	2. 6	2. 3
Cuba	2, 932	2, 905	2, 730	3, 467	5. 0	5. 1	4. 3	5. 5
Other countries	3, 581	6, 055	6, 530	4, 516	6. 1	10. 6	10. 2	7. 1

See footnotes at end of table.

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30—							
	1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Fruits—Continued.								
Fresh—Continued.	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*1,000 boxes*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Lemons [2]— Total	1,247	659	1,308	391	100.0	100.0	100.0	100.0
Total Europe	1,244	659	1,304	390	99.8	100.0	99.7	99.7
Italy	1,235	654	1,300	382	99.0	99.2	99.4	97.7
Other Europe	9	5	4	8	.8	.8	.3	2.0
Other countries	3	0	4	1	.2	.0	.3	.3
	1,000 gallons	*1,000 gallons*	*1,000 gallons*	*1,000 gallons*				
Olives— Total	5,992	5,212	6,458	6,955	100.0	100.0	100.0	100.0
Total Europe	5,950	5,185	6,415	6,909	99.3	99.5	99.3	99.3
Spain	4,466	4,664	5,739	6,209	74.5	89.5	88.9	89.3
Greece	1,127	96	144	204	18.8	1.8	2.2	2.9
Other Europe	357	425	532	496	6.0	8.2	8.2	7.1
Other countries	42	27	43	46	.7	.5	.7	.7
Grains, flours, etc.:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Rice, cleaned, except patna— Total	92,629	54,088	33,674	25,166	100.0	100.0	100.0	100.0
Hong Kong	21,301	19,741	20,786	17,934	23.0	36.5	61.7	71.3
Netherlands	34,692	5,837	2,139	271	37.4	10.8	6.4	1.1
Germany	10,038	3,768	1,077	396	10.8	7.0	3.2	1.6
Mexico	4,170	8,002	1,264	1,022	4.5	14.8	3.8	4.1
British India	2,879	465	1,061	2,380	3.1	.8	3.2	9.5
Italy	3,664	3,695	3,971	1,032	4.0	6.8	11.8	4.1
Siam	112	2,912	448	1	.1	5.4	1.3	.0
United Kingdom	2,332	692	126	12	2.5	1.3	.4	.0
Other countries	13,441	8,976	2,802	2,118	14.6	16.6	8.2	8.3
Rice, patna [3]— Total	-------	[1] 1,221	1,826	2,349	------	[1] 100.0	100.0	100.0
Netherlands	-------	[1] 1,215	1,826	2,349	------	[1] 99.5	100.0	100.0
Other countries	-------	[1] 6	0	0	------	[1] .5	.0	.0
Rice, uncleaned— Total	30,749	11,728	5,996	8,060	100.0	100.0	100.0	100.0
Japan	11,686	3,213	2,316	1,441	38.0	27.4	38.6	17.9
Mexico	13,708	7,802	3,036	5,904	44.6	66.5	50.6	73.3
Other countries	5,355	713	644	715	17.4	6.1	10.8	8.8
Rice, flour and meal— Total	6,588	2,972	2,606	1,239	100.0	100.0	100.0	100.0
Mexico	2,546	2,307	1,981	508	38.6	77.6	76.0	41.0
Japan	440	469	442	504	6.7	15.8	17.0	40.7
Netherlands	3,189	0	21	0	48.4	.0	.8	.0
China	81	36	38	68	1.2	1.2	1.5	5.5
Other countries	332	160	124	159	5.1	5.4	4.7	12.8
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Wheat— Total	15,598	13,235	15,706	21,430	100.0	100.0	100.0	100.0
Canada	15,596	13,234	15,706	21,429	100.0	100.0	100.0	100.0
Other countries	2	1	0	1	.0	.0	.0	.0
	1,000 barrels	*1,000 barrels*	*1,000 barrels*	*1,000 barrels*				
Wheat flour— Total	17	6	6	3	100.0	100.0	100.0	100.0
Canada	17	5	3	2	100.0	83.3	50.0	66.7
Ecuador	0	0	2	0	.0	.0	33.3	.0
Other countries	0	1	1	1	.0	16.7	16.7	33.3

See footnotes at end of table.

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLE PRODUCTS—continued								
Nuts:	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Almonds, shelled—Total	18, 575	15, 699	18, 257	18, 106	100. 0	100. 0	100. 0	100. 0
Total Europe	18, 280	15, 171	17, 843	17, 536	98. 4	96. 6	97. 7	96. 9
Italy	4, 156	6, 076	7, 703	6, 578	22. 4	38. 7	42. 2	36. 3
Spain	12, 801	8, 389	9, 637	10, 399	68. 9	53. 4	52. 8	57. 4
France	1, 142	541	306	286	6. 1	3. 4	1. 7	1. 6
Other Europe	181	165	197	273	1. 0	1. 1	1. 0	1. 6
Other countries	295	528	414	570	1. 6	3. 4	2. 3	3. 1
Almonds, not shelled—Total	3, 703	638	464	1, 891	100. 0	100. 0	100. 0	100. 0
Total Europe	3, 670	499	463	1, 882	99. 1	78. 2	99. 8	99. 5
Spain	3, 127	158	229	1, 068	84. 4	24. 8	49. 4	56. 5
France	335	154	131	474	9. 0	24. 1	28. 2	25. 1
Italy	156	180	98	73	4. 2	28. 2	21. 1	3. 9
Other Europe	52	7	5	267	1. 5	1. 1	1. 1	14. 0
Brazil	0	130	0	0	. 0	20. 4	. 0	. 0
Other countries	33	9	1	9	. 9	1. 4	. 2	. 5
Filberts, shelled—Total	6, 669	4, 950	6, 600	5, 606	100. 0	100. 0	100. 0	100. 0
Total Europe	6, 489	4, 635	4, 541	3, 775	97. 3	93. 6	68. 8	67. 3
Spain	669	421	329	639	10. 0	8. 5	5. 0	11. 4
France	2, 150	1, 414	1, 206	1, 027	32. 2	28. 6	18. 3	18. 3
Turkey in Europe	2, 325	1, 910	2, 559	0	34. 9	38. 6	38. 8	. 0
Other Europe	1, 345	890	447	2, 109	20. 2	17. 9	6. 7	37. 6
Turkey in Asia	124	223	2, 059	1, 800	1. 9	4. 5	31. 2	32. 1
Other countries	56	92	0	31	. 8	1. 9	. 0	. 6
Filberts, not shelled—Total	11, 105	9, 822	11, 244	12, 134	100. 0	100. 0	100. 0	100. 0
Total Europe	11, 032	9, 690	11, 168	12, 134	99. 3	98. 7	99. 3	100. 0
Italy	8, 546	9, 296	6, 687	11, 053	77. 0	94. 6	59. 5	91. 1
Spain	714	49	1, 936	818	6. 4	. 5	17. 2	6. 7
Turkey (Europe and Asia)	976	54	1, 265	20	8. 8	. 5	11. 3	. 2
Other Europe	796	291	1, 280	243	7. 1	3. 1	11. 3	2. 0
Other countries	73	132	76	0	. 7	1. 3	. 7	. 0
Peanuts, shelled—Total	33, 666	46, 852	54, 784	26, 606	100. 0	100. 0	100. 0	100. 0
China	32, 351	44, 729	49, 986	23, 987	96. 1	95. 5	91. 2	90. 2
Other countries	1, 315	2, 123	4, 798	2, 619	3. 9	4. 5	8. 8	9. 8
Peanuts, not shelled—Total	3, 539	4, 410	13, 498	5, 709	100. 0	100. 0	100. 0	100. 0
China	2, 837	3, 812	12, 339	4, 680	80. 2	86. 4	91. 4	82. 0
Japan, including Chosen	235	245	509	360	6. 6	5. 6	3. 8	6. 3
Other countries	467	353	650	669	13. 2	8. 0	4. 8	11. 7
Walnuts, shelled—Total	22, 680	20, 979	16, 015	17, 956	100. 0	100. 0	100. 0	100. 0
Total Europe	19, 296	12, 002	13, 540	11, 341	85. 1	57. 2	84. 5	63. 2
France	17, 474	8, 995	12, 551	9, 308	77. 0	42. 9	78. 4	51. 8
Other Europe	1, 822	3, 007	989	2, 033	8. 1	14. 3	6. 1	11. 4
China	3, 020	8, 144	1, 952	5, 052	13. 3	38. 8	12. 2	28. 1
Other countries	364	833	523	1, 563	1. 6	4. 0	3. 3	8. 7

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30—							
	1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLES PRODUCTS—continued								
Nuts—Continued.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Walnuts, not shelled— Total	21, 472	25, 706	10, 314	15, 581	100. 0	100. 0	100. 0	100. 0
Total Europe	18, 408	18, 652	6, 946	10, 557	85. 7	72. 6	67. 3	67. 8
Italy	9, 064	12, 082	4, 558	4, 501	42. 2	47. 0	44. 2	28. 9
France	6, 798	3, 566	2, 244	2, 720	31. 7	13. 9	21. 8	17. 5
Other Europe	2, 546	3, 004	144	3, 336	11. 8	11. 7	1. 3	21. 4
China	2, 395	5, 870	2, 531	4, 575	11. 2	22. 8	24. 5	29. 4
Other countries	669	1, 184	837	449	3. 1	4. 6	8. 2	2. 8
Oils, vegetable:								
Coconut oil, product of Philippine Islands	200, 878	286, 776	273, 309	377, 288	100. 0	100. 0	100. 0	100. 0
Olive oil, edible— Total	83, 178	87, 922	70, 130	88, 118	100. 0	100. 0	100. 0	100. 9
Total Europe	81, 666	86, 393	69, 231	86, 821	98. 2	98. 3	98. 7	98. 5
Italy	57, 821	58, 706	45, 145	62, 202	69. 5	66. 8	64. 4	70. 6
Spain	17, 147	21, 682	17, 797	16, 910	20. 6	24. 7	25. 4	19. 2
France	5, 647	4, 705	5, 335	6, 182	6. 8	5. 4	7. 6	7. 0
Other Europe	1, 051	1, 300	954	1, 527	1. 3	1. 4	1. 3	1. 7
Other countries	1, 512	1, 529	899	1, 297	1. 8	1. 7	1. 3	1. 5
Soy-bean oil— Total	17, 401	23, 553	14, 562	17, 172	100. 0	100. 0	100. 0	100. 0
Kwantung	13, 801	15, 759	13, 546	11, 089	79. 3	66. 9	93. 0	64. 6
China	1	1, 803	891	1, 520	. 0	7. 7	6. 1	8. 9
Japan	2, 801	4, 033	41	1, 729	16. 1	17. 1	. 3	10. 1
Other countries	798	1, 958	84	2, 834	4. 6	8. 3	. 6	16. 4
Oilseeds:								
Copra, not prepared— Total	392, 759	454, 546	456, 158	629, 937	100. 0	100. 0	100. 0	100. 0
Philippine Islands	248, 587	330, 946	336, 920	386, 567	63. 3	72. 8	73. 9	61. 4
French Oceania	24, 799	29, 188	25, 273	21, 306	6. 3	6. 4	5. 5	3. 4
British Malaya	70, 386	59, 746	40, 381	84, 700	17. 9	13. 1	8. 9	13. 4
British Oceania	27, 600	19, 131	19, 941	37, 685	7. 0	4. 2	4. 4	6. 0
Other countries	21, 387	15, 535	33, 643	99, 679	5. 5	3. 5	7. 3	15. 8
	1,000 bushels	*1,000 bushels*	*1,000 bushels*	*1,000 bushels*				
Flaxseed— Total	19, 354	24, 224	18, 112	23, 437	100. 0	100. 0	100. 0	100. 0
Argentina	16, 375	20, 581	16, 057	20, 581	84. 6	85. 0	88. 7	87. 8
Canada	2, 949	3, 429	1, 933	2, 528	15. 2	14. 2	10. 7	10. 8
Other countries	30	214	122	328	. 2	. 8	. 6	1. 4
Seeds, except oilseeds:								
Clover seed—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Clover, red— Total	19, 589	11, 012	5, 434	7, 552	100. 0	100. 0	100. 0	100. 0
Total Europe	18, 899	10, 702	5, 388	7, 401	96. 5	97. 2	99. 2	98. 0
France	18, 336	10, 173	493	3, 664	93. 6	92. 4	9. 1	48. 5
Germany	377	251	697	679	1. 9	2. 3	12. 8	9. 0
Poland-Danzig	5	0	2, 015	1, 278	. 0	. 0	37. 1	16. 9
Russia in Europe	0	0	1, 328	202	. 0	. 0	24. 4	2. 7
Other Europe	181	278	855	1, 578	1. 0	2. 5	15. 8	20. 9
Other countries	690	310	46	151	3. 5	2. 8	. 8	2. 0

TABLE 499.—*Principal agricultural products imported into the United States, by countries, 1926–1929*—Continued

Article and country from which imported	Year ended June 30— 1926	1927	1928	1929	1926	1927	1928	1929
VEGETABLES PRODUCTS—continued								
Seeds, except oilseeds—Continued.								
All other, including alsike, crimson, and all other clover—	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Total	29,093	14,333	16,397	14,944	100.0	100.0	100.0	100.0
Total, Europe	8,405	3,581	3,260	4,975	28.9	25.0	19.9	33.3
France	5,826	1,561	791	2,750	20.0	10.9	4.8	18.4
Germany	965	455	799	1,651	3.3	3.2	4.9	11.0
Other Europe	1,614	1,565	1,670	574	5.6	10.9	10.2	3.9
Canada	20,679	10,745	13,121	8,899	71.1	75.0	80.0	59.5
Other countries	9	7	16	1,070	.0	.0	.1	7.2
Spices:								
Pepper, unground— Total	28,221	25,217	23,978	25,663	100.0	100.0	100.0	100.0
Dutch East Indies	12,745	6,636	6,446	9,205	45.2	26.3	26.9	35.9
British Malaya	2,419	2,287	2,831	1,469	8.6	9.1	11.8	5.7
British India	9,533	11,048	7,907	6,218	33.8	43.8	32.9	24.2
United Kingdom	1,063	3,577	5,292	3,435	3.8	14.2	22.1	13.4
Other countries	2,461	1,669	1,502	5,336	8.6	6.6	6.3	20.8
Sugar, raw, cane:	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*				
Total	4,420	4,420	4,045	4,752	100.0	100.0	100.0	100.0
Cuba	3,861	3,953	3,399	4,109	87.4	89.4	84.0	86.5
Philippine Islands	510	428	613	605	11.5	9.7	15.2	12.7
Other countries	49	39	33	38	1.1	.9	.8	.8
Tea.	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*				
Total	99,411	97,402	90,099	92,635	100.0	100.0	100.0	100.0
Japan	29,135	28,430	25,399	27,329	29.3	29.2	28.2	29.5
United Kingdom	22,928	22,136	20,380	23,608	23.1	22.7	22.6	25.5
Ceylon	17,717	16,578	16,326	16,893	17.8	17.0	18.1	18.2
China	13,713	11,655	10,131	8,878	13.8	12.0	11.1	9.6
Dutch East Indies	8,264	7,660	5,398	5,358	8.3	7.9	6.0	5.8
British India	5,051	8,059	9,198	7,688	5.1	8.3	10.2	8.3
Other countries	2,603	2,884	3,267	2,881	2.6	2.9	3.8	3.1
Tobacco, leaf, unmanufactured:								
Leaf, product of Philippine Islands	1,129	1,117	2,541	4,678	100.0	100.0	100.0	100.0
Leaf, for cigar wrappers— Total	6,590	6,473	6,344	6,212	100.0	100.0	100.0	100.0
Netherlands	6,354	6,358	6,218	6,095	96.4	98.2	98.0	98.1
Other countries	236	115	126	117	3.6	1.8	2.0	1.9
All other leaf— Total	60,561	83,499	70,227	66,001	100.0	100.0	100.0	100.0
Greece	13,342	28,383	15,694	16,741	22.0	34.0	22.3	25.4
Cuba	20,976	24,233	21,530	22,116	34.6	29.0	30.7	33.5
Italy	12,412	13,708	13,743	11,286	20.5	16.4	19.6	17.1
Turkey (Europe and Asia)	12,571	15,355	17,289	14,269	20.8	18.4	24.6	21.6
Germany	141	973	1,242	305	.2	1.2	1.8	.5
Other countries	1,119	847	729	1,284	1.9	1.0	1.0	1.9
India rubber, crude:								
Total	921,964	962,467	926,040	1,226,929	100.0	100.0	100.0	100.0
British Malaya	556,907	602,756	524,834	811,843	60.4	62.6	56.7	66.2
Dutch East Indies	157,150	156,772	170,161	215,863	17.0	16.3	18.4	17.6
United Kingdom	60,706	55,155	110,575	50,938	6.6	5.7	11.9	4.2
Ceylon	73,846	89,874	73,542	112,257	8.0	9.3	7.9	9.1
Other countries	73,355	57,910	46,928	36,028	8.0	6.1	5.1	2.9

Bureau of Agricultural Economics. Compiled from Monthly Summary of Foreign Commerce of the United States, June issues, 1927–1929, and official records of the Bureau of Foreign and Domestic Commerce.

[1] January-June. [2] Boxes of 74 pounds net. [3] Not separately classified prior to Jan. 1, 1927.

TABLE 500.—*Vegetable oils: Exports from the United States, 1910–1929*

Year ended June 30—	Corn	Cotton-seed	Linseed	Cocoa butter or butterine	Coconut	Peanut	Soybean
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
1910	11,299	223,955	228				
1911	25,317	225,521	175				
1912	23,866	399,471	247				
1913	19,839	315,233	1,734				
1914	18,282	192,963	239				
1915	17,790	318,367	1,212				
1916	8,968	266,512	714				
1917	8,780	158,912	1,202				
1918	1,831	100,780	1,188				
1919	1,095	178,709	1,096				
1920	12,483	159,400	1,136	11,048	141,088	4,922	67,782
1921	6,919	283,268	561	3,171	6,639	1,595	5,118
1922	5,280	91,615	366	1,856	10,185	1,802	537
1923	5,224	64,292	414	957	12,993	188	2,495
1924	4,196	39,418	350	888	19,423	168	2,892
1925	3,586	53,261	320	1,577	17,890	(1)	579
1926	2,927	59,015	311	1,766	15,444	(1)	623
1927	405	57,580	365	290	19,826	(1)	3,104
1928	329	61,470	296	1,897	22,358	(1)	7,514
1929, preliminary	323	29,531	269	1,010	24,556	(1)	8,241

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States, 1910–1918; Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1929.

[1] Included with "Other vegetable oils and fats."

TABLE 501.—*Vegetable oils: Imports into the United States, 1910–1929*

Year ended June 30—	Castor [1]	Chinese nut	Cocoa butter or butterine	Coconut	Cottonseed [1]	Linseed	Olive	Palm	Palm kernel	Peanut	Rapeseed	Soybean
	1,000 gals.	*1,000 gals.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 gals.*	*1,000 gals.*	*1,000 lbs.*	*1,000 lbs.*	*1,000 gals.*	*1,000 gals.*	*1,000 lbs.*
1910	7	[2] 5,760	3,370	48,346	(3)	(3)	4,545	92,772	(3)	(4)	[5] 1,083	(3)
1911	7	[2] 7,042	4,279	51,118	(3)	(3)	4,984	57,100	(3)	(4)	[5] 1,363	(3)
1912	8	4,768	6,075	46,371	1,513	737	5,473	47,159	25,393	896	1,183	28,021
1913	5	5,997	3,603	50,504	3,384	174	5,840	50,229	23,569	1,196	1,550	12,340
1914	189	4,932	2,839	74,386	17,293	192	6,981	58,040	34,328	1,337	1,464	16,360
1915	63	4,940	150	63,135	15,162	535	7,364	31,486	4,906	853	1,499	19,207
1916	253	4,968	400	66,008	17,181	50	8,109	40,497	6,761	1,475	2,561	98,120
1917	324	6,864	166	79,223	13,703	111	8,184	36,074	1,857	3,026	1,085	162,690
1918	1,175	4,816	(6)	259,195	14,291	51	2,652	27,405	19	8,289	3,056	336,825
1919	472	6,217	3	344,728	20,410	990	4,398	19,281	1,945	11,393	2,091	236,805
1920	271	10,614	42	271,540	24,165	4,550	7,029	50,165	54	22,064	1,230	195,774
1921	99	4,440	915	173,889	1,315	1,997	4,705	31,076	2,769	2,422	1,172	49,331
1922	46	7,410	7,123	230,236	(6)	22,494	11,112	39,159		384	1,352	8,283
1923	185	11,919	3,010	212,573	45	7,568	15,635	118,816		1,007	1,770	38,635
1924	36	10,786	1,169	181,230	(6)	2,379	15,121	86,784	1,126	2,008	2,068	17,631
1925	41	12,626	733	250,121	0	3,145	15,743	114,387	37,364	468	1,959	20,434
1926	66	11,315	14	200,878	283	2,231	18,368	152,254	85,074	450	2,088	17,401
1927	22	13,657	256	286,776	6,396	177	17,964	110,184	14,760	1,061	2,731	23,553
1928	125	11,150	18	273,309	1	46	15,746	183,977	56,021	648	2,604	14,562
1929, preliminary	138	15,365	17	377,288	1	890	19,706	228,330	80,514	454	2,543	17,172

Bureau of Agricultural Economics. Compiled from Foreign Commerce and Navigation of the United States 1910–1918: Monthly Summary of Foreign Commerce of the United States, June issues, 1919–1929.

[1] Imports for consumption.
[2] Includes peanut oil.
[3] Included in all other fixed or expressed.
[4] Included in Chinese nut oil.
[5] Includes hempseed.
[6] Less than 500 pounds.

TABLE 502.—*Oil cake and oil-cake meal: International trade, average 1909–1913, annual 1926–1928*

Country	Year ended Dec. 31							
	Average 1909–1913		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
United States	0	1, 704, 124	120, 555	1, 449, 758	188, 884	1, 569, 969	250, 786	1, 186, 934
Russia	0	1, 453, 413	0	894, 464	0	663, 880	0	314, 627
Germany	1, 686, 416	525, 108	971, 767	835, 906	1, 231, 000	697, 136	1, 205, 083	972, 716
British India	1, 262	268, 648	305	499, 052	220	581, 860	320	699, 241
France	288, 968	476, 863	55, 132	304, 737	90, 852	325, 283	75, 411	438, 107
Egypt	0	161, 624	11	355, 684	2	401, 257	---------	347, 802
Egypt	[1] 174	147, 468	0	284, 486	0	230, 257	0	287, 111
Italy	10, 550	55, 115	631	140, 812	632	265, 450	230	324, 048
Argentina	0	42, 587	0	134, 037	0	173, 438	0	144, 049
Dutch East Indies	2, 509	13, 242	0	105, 788	0	140, 736	0	[2] 166, 488
Rumania	12	21, 654	14	131, 812	---------	---------	---------	---------
Peru	0	10, 930	0	66, 656	0	88, 428	0	79, 042
Brazil	0	[3] 6, 574	0	61, 720	---------	---------	---------	---------
Czechoslovakia	0	0	57, 251	61, 046	72, 817	54, 878	106, 308	46, 186
Canada	7, 752	51, 370	19, 192	39, 323	15, 486	46, 147	13, 930	44, 419
Spain	0	2, 164	1, 493	44, 445	---------	---------	---------	---------
Australia	148	1, 347	[4] 15	[4] 902	[4] 4, 772	[4] 926	[4] 6, 261	[4] 5, 711
Hungary	[5] 53, 673	[5] 124, 873	8, 591	14, 233	15, 911	15, 966	29, 536	12, 045
PRINCIPAL IMPORTING COUNTRIES								
Denmark	1, 002, 329	15, 777	1, 532, 525	33, 434	1, 587, 719	22, 891	1, 471, 914	---------
United Kingdom	790, 865	161, 798	1, 105, 848	193, 265	1, 087, 257	144, 243	819, 004	208, 134
Netherlands	707, 116	219, 819	731, 235	117, 686	592, 427	130, 177	669, 165	120, 920
Japan	189, 868	0	392, 675	29, 894	314, 853	29, 436	350, 960	56, 248
Belgium	543, 648	155, 373	280, 298	79, 031	346, 224	81, 009	334, 994	93, 864
Sweden	346, 755	1, 535	396, 235	7, 430	293, 246	15, 963	311, 856	9, 416
Irish Free State	0	0	104, 666	0	111, 835	0	106, 412	0
Finland	25, 333	2, 125	216, 906	0	163, 078	0	262, 969	0
Switzerland	69, 352	1, 413	83, 944	13, 653	56, 064	18, 536	75, 052	17, 735
Norway	55, 112	2, 889	71, 900	62	77, 298	8	63, 371	---------
Ceylon	[6] 40, 494	[6] 28, 509	42, 851	17, 953	43, 045	19, 393	42, 636	32, 650
Austria	---------	---------	20, 293	1, 812	33, 204	745	45, 513	899
Total 30 countries	5, 822, 336	5, 656, 342	6, 214, 333	5, 919, 081	6, 326, 816	5, 718, 012	6, 241, 711	5, 608, 392

Bureau of Agricultural Economics. Official sources except as otherwise noted. The class called here "Oil cake and oil-cake meal" includes the edible cake and meal remaining after making oil from such products as cottonseed, flaxseed, peanuts, corn, etc. Soybean cake is not included in this table.

[1] 3-year average.
[2] Java and Madura only.
[3] 4-year average.
[4] Year ended June 30.
[5] Average for Austria-Hungary.
[6] 1 year only.

TABLE 503.—*Rubber: International trade, average 1909–1913, annual 1926–1928*

Country	Year ended Dec. 31							
	Average 1909–1913		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
British Malaya	[1] 53,472	[1] 85,435	340,890	883,121	411,473	837,136	336,009	920,326
Dutch East Indies	[2] 1	7,679	0	538,986	0	629,004	[3] 0	[3] 132,142
Ceylon	[4] 1,299	10,953	10,944	131,876	11,119	125,063	11,435	128,326
Brazil	0	84,938	0	48,954	0	57,677	0	41,200
British India	0	[4] 1,504	18	22,118	72	25,520	33	24,180
Indo-China	1	398	[1] 25	19,350	[1] 31	21,225	---------	21,589
British North Borneo	0	[1] 331	0	[1] 13,656	0	[1] 14,788	---------	---------
Bolivia	0	8,395	0	6,844	0	8,517	---------	---------
Mexico	0	[1] 13,462	[1] 259	[1] 11,080	[1] 313	10,946	---------	---------
French Guinea	[1] 241	3,937	[1] 81	2,744	[1] 4	[1] 2,060	---------	---------
French Equatorial Africa	[1] 10	[1] 3,775	[1] 389	[1] 3,483	[1] 454	[1] 3,332	---------	---------
Kamerun	0	6,409	0	[1] 2,286	[1] 7	[1] 1,970	---------	---------
Ecuador	0	1,040	0	2,400	0	2,290	---------	---------
Belgian Congo	0	7,755	3	2,489	0	2,750	---------	---------
Nigeria	0	3,054	0	[1] 3,571	0	[1] 4,474	---------	---------
Switzerland	391	725	914	1,750	1,093	1,694	1,268	2,281
Gold Coast	0	2,393	0	[1] 1,418	0	[1] 711	---------	---------
Peru	0	5,030	0	466	0	697	---------	---------
Angola	0	5,620	0	[1] 1,836	0	[1] 962	---------	---------
PRINCIPAL IMPORTING COUNTRIES								
United States	100,180	0	925,878	0	954,750	0	978,107	0
France	32,704	21,615	107,361	20,222	95,128	18,714	114,389	21,487
Germany	42,004	9,844	55,201	4,185	93,836	6,721	93,455	8,660
Japan	1,917	0	40,923	0	46,997	0	57,440	0
Canada	3,945	0	45,367	0	59,253	0	69,220	0
Italy	5,381	225	23,983	596	25,206	204	27,883	58
United Kingdom	43,141	0	190,251	0	134,047	0	10,855	0
Netherlands	10,822	7,172	11,925	5,943	10,813	9,389	9,433	4,527
Russia	19,131	0	16,391	0	22,868	0	33,975	0
Belgium	25,891	20,749	8,074	2,665	17,095	2,069	21,498	2,874
Spain	1,067	0	8,804	0	---------	---------	---------	---------
Austria	[5] 6,696	[5] 1,619	5,008	1,019	7,750	1,231	8,001	1,163
Sweden	1,695	1	4,701	167	4,951	168	5,218	170
Czechoslovakia [1]	0	0	1,122	32	6,568	489	---------	---------
Hungary	0	0	1,327	68	2,424	78	3,349	269
Denmark	250	0	1,291	4	1,289	7	1,269	---------
Total 35 countries	350,239	314,058	1,801,134	1,733,359	1,907,541	1,789,886	1,782,837	1,309,251

Bureau of Agricultural Economics. Official sources except where otherwise noted. Figures for rubber include "India rubber" so called, caoutchouc, caucho, jebe (Peru), hule (Mexico), borracha, masserandubia mangabeira, manicoba, sorva, and seringa (Brazil), gamelastiek (Dutch East Indies), caura, ser nambi, (Venezuela).

[1] International Yearbook of Agricultural Statistics.
[2] 1 year only.
[3] Java and Madura.
[4] 3-year average.
[5] Average for Austria-Hungary.

TABLE 504.—*Coffee: International trade, average 1909–1913, annual 1926–1928*

Country	Average 1909–1913		Year ended Dec. 31: 1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Brazil	0	1, 672, 282	0	1, 818, 999	0	1, 999, 352	0	1, 836, 123
Colombia	0	104, 398	[1] 0	[1] 324, 639	---------	---------	---------	---------
Dutch East Indies	4, 227	54, 149	2, 439	164, 070	3, 726	186, 957	[2] 93	[2] 107, 672
Venezuela	0	111, 326	0	133, 946	0	112, 569	0	---------
Guatemala	0	85, 951	0	94, 410	0	116, 539	0	98, 245
Salvador	[3] 1, 593	62, 830	0	111, 611	0	79, 813	0	---------
Haiti	0	61, 943	0	73, 666	0	68, 280	0	84, 579
Mexico	[4] 167	48, 991	[1] 153	[1] 46, 836	[1] 220	57, 499	---------	69, 042
Costa Rica	0	27, 515	0	[5] 40, 248	[1] 0	[1] 35, 613	0	---------
Nicaragua	[6] 138	19, 033	[1] 99	38, 959	0	[1] 22, 608	---------	39, 252
British India	[4] 605	27, 780	4, 746	12, 247	4, 664	31, 329	4, 943	28, 556
Jamaica	0	8, 263	0	[1] 7, 439	[1] 0	[1] 9, 153	0	---------
PRINCIPAL IMPORTING COUNTRIES								
United States	907, 899	[7] 44, 251	1, 493, 316	29, 433	1, 433, 340	18, 459	1, 456, 527	8, 520
France	245, 752	41	340, 023	293	350, 526	161	363, 909	131
Germany	399, 965	1, 757	232, 364	267	274, 337	241	299, 209	417
Netherlands	283, 633	189, 288	114, 262	44, 984	111, 358	36, 861	110, 679	32, 783
Italy	58, 278	458	96, 417	3	100, 851	3	105, 196	3
Sweden	74, 486	24	92, 519	31	95, 034	23	94, 777	49
Belgium	111, 738	33, 627	88, 011	412	91, 474	838	87, 106	1, 116
Spain	29, 317	9	44, 680	3	52, 899	12	---------	---------
Argentina	28, 125	0	51, 312	0	54, 069	0	---------	0
Denmark	33, 102	152	55, 996	535	54, 445	631	56, 491	765
United Kingdom	28, 581	241	25, 189	221	45, 490	212	45, 933	---------
Finland	28, 624	0	29, 167	0	33, 678	0	40, 646	0
Norway	29, 309	0	37, 293	0	37, 818	0	36, 726	0
Cuba	24, 906	4	15, 671	2	22, 780	1	---------	---------
Union of South Africa	26, 458	36	27, 829	13	29, 532	10	26, 631	16
Switzerland	25, 029	62	29, 144	150	29, 250	201	27, 668	270
Czechoslovakia	0	0	29, 200	1	29, 591	5	28, 497	3
Canada	13, 378	55	24, 747	41	26, 513	58	28, 143	47
Egypt	15, 654	0	20, 815	10	21, 925	4	18, 835	5
Yugoslavia [1]	0	0	20, 507	3	20, 679	1	21, 192	1
British Malaya	[1] 7, 524	[1] 7, 137	18, 581	10, 234	18, 870	10, 364	14, 648	7, 003
Austria	[8] 128, 304	[8] 8	18, 873	4	18, 190	5	19, 156	7
Poland	0	0	13, 990	1	15, 398	2	16, 211	13
Hungary	---------	---------	6, 934	0	8, 043	0	8, 424	0
Russia	26, 073	0	[1] 650	[1] 0	[1] 1, 911	[1] 0	---------	---------
Total 37 countries	2, 532, 865	2, 561, 611	2, 934, 927	2, 953, 729	2, 986, 611	2, 787, 804	2, 911, 640	2, 314, 618

Bureau of Agricultural Economics. Compiled from official sources except where otherwise noted. The item coffee comprises unhulled and hulled, ground or otherwise prepared, but imitation or "surrogate" coffee and chicory are excluded.

[1] International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] 1 year only.
[4] 4-year average.
[5] Fiscal year, presumably a crop year ended September 30.
[6] 3-year average.
[7] Chiefly from Porto Rico.
[8] Average for Austria-Hungary.

TABLE 505.—*Tea: International trade, average 1909–1913, annual 1925–1928*

Country	Year ended Dec. 31									
	Average 1909–1913		1925		1926		1927		1928, Preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
British India	8,002	267,887	7,536	344,142	7,297	350,970	7,839	375,949	10,164	364,671
Ceylon	[1] 1	189,016	1	209,791	0	217,184	2	227,038	-------	236,719
Dutch East Indies	6,742	46,675	7,933	102,281	7,778	120,174	7,995	127,292	[2] 8,592	[2] 118,141
China	18,890	197,997	3,211	108,875	11,011	109,129	8,809	114,651	13,030	123,150
Japan	590	35,823	777	28,041	1,115	23,965	882	23,487	1,029	23,814
Formosa	68	23,640	29	21,028	57	22,412	83	22,156	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United Kingdom	293,045	0	402,156	0	410,986	0	451,415	0	419,945	0
United States	98,897	0	100,962	0	95,930	0	89,169	0	89,824	0
Australia	35,442	0	[3] 49,935	0	[3] 46,949	0	[3] 49,672	0	-------	0
Canada	37,927	0	37,392	0	37,630	0	38,117	0	39,527	0
Netherlands	11,383	45	19,949	26	26,177	25	27,694	28	28,186	26
Irish Free State	0	0	22,611	0	23,596	0	23,667	0	22,649	0
Russia	157,704	866	23,303	[3] 1,769	31,770	[3] 1,300	33,741	[3] 395	40,580	-------
Persia [4]	9,446	125	14,449	2,135	15,146	438	13,090	470	-------	-------
New Zealand	7,542	0	10,835	0	10,928	0	10,825	0	11,149	0
Morocco	6,696	0	12,020	0	11,184	0	11,333	0	-------	-------
Union of South Africa	5,192	61	9,815	8	10,303	127	11,812	164	11,585	133
British Malaya	[3] 11,983	[3] 5,318	9,127	1,301	11,198	1,533	10,778	1,238	9,973	1,317
Egypt	1,950	0	9,644	221	8,408	300	8,605	233	14,318	291
Germany	8,964	23	9,153	1	10,116	0	11,409	0	11,786	0
Chile	3,505	0	5,233	0	4,430	0	4,653	0	6,870	0
Poland	0	0	3,717	3	3,938	1	4,621	0	5,024	0
Argentina	3,890	0	4,071	0	2,739	0	4,101	0	-------	-------
Indo-China	3,295	1,145	4,060	2,281	5,592	2,530	5,071	1,711	5,098	2,065
France	2,806	61	3,841	125	3,570	108	3,022	48	3,338	55
Czechoslovakia	0	0	1,351	0	1,449	9	1,455	2	1,598	2
Austria	[5] 3,424	[5] 3	875	0	1,231	0	1,278	0	1,360	0
Hungary	-------	-------	621	1	646	23	884	0	924	0
Total 28 countries	737,384	768,685	774,607	822,029	801,174	850,228	842,022	894,862	756,549	870,384

Bureau of Agricultural Economics. Official sources except where otherwise noted.

[1] 2-year average.
[2] Java and Madura only.
[3] International Yearbook of Agricultural Statistics.
[4] The figures shown are for the year ended Mar. 20 of the year following the date shown.
[5] Average for Austria-Hungary.

TABLE 506.—*Copra: International trade, years 1925–1928*

Country	Year ended Dec. 31							
	1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Dutch East Indies	0	773, 837	0	830, 873	0	673, 013	0	[2] 104, 793
Philippine Islands	0	323, 434	549	383, 647	290	439, 419	2, 273	516, 795
British Malaya	149, 666	343, 249	181, 462	415, 305	126, 645	320, 414	196, 589	409, 593
Ceylon	640	254, 656	641	270, 973	224	222, 001	0	221, 385
Fiji	0	54, 058	0	62, 424	0	59, 494	0	62, 601
Solomon Islands [1]	0	43, 276	0	50, 012	0	---------	0	---------
Zanzibar	10, 672	38, 630	10, 223	38, 873	9, 248	31, 765	---------	---------
Tonga [1]	0	30, 818	0	31, 342	0	---------	0	---------
Mozambique	0	38, 300	0	39, 827	0	38, 412	0	41, 684
West Samoa [1]	0	32, 522	0	27, 438	0	26, 129	0	---------
Tanganyika	0	17, 076	0	16, 460	0	16, 278	0	---------
PRINCIPAL IMPORTING COUNTRIES								
Germany	379, 511	578	438, 087	1, 434	413, 295	310	442, 593	16
United States	364, 076	0	457, 599	0	450, 995	0	500, 892	0
France [3]	344, 392	25	304, 725	17	345, 355	19	405, 174	40
Netherlands	293, 075	156	340, 257	936	297, 870	554	302, 201	689
Austria	26, 233	0	30, 321	0	29, 776	0	29, 638	0
Belgium	19, 140	260	21, 684	30	12, 386	121	13, 628	101
United Kingdom	174, 830	0	130, 859	0	79, 596	0	89, 490	0
Denmark	108, 142	0	107, 000	0	111, 519	0	136, 083	0
Australia [1]	71, 871	0	78, 659	0	79, 772	0	---------	0
Italy	56, 743	16	51, 709	7	61, 779	12	58, 688	4
Sweden	31, 129	0	35, 957	0	22, 015	0	21, 462	0
Latvia	2, 956	0	3, 051	0	2, 824	0	3, 649	0
British India [1]	7, 025	231	663	3, 662	2, 867	2, 032	3, 736	226
Total 24 countries	2, 040, 101	1, 951, 122	2, 193, 446	2, 173, 260	2, 046, 446	1, 829, 973	2, 206, 186	1, 357, 927

Bureau of Agricultural Economics. Compiled from official sources.

[1] From International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] Includes some coconut.

TABLE 507.—*Coconut oil: International trade, years 1924–1928*

Country	Year ended Dec. 31									
	1924		1925		1926		1927		1928, preliminary	
	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports	Exports
PRINCIPAL EXPORTING COUNTRIES	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
Philippine Islands	0	246, 097	0	229, 560	0	258, 579	0	319, 232	0	313, 589
Netherlands	3, 545	110, 902	11, 460	115, 689	10, 717	117, 981	13, 147	115, 792	3, 199	124, 479
Ceylon	1	61, 895	18	69, 095	9	63, 892	11	75, 393	-------	87, 261
France [3]	10, 127	21, 930	12, 566	23, 498	10, 199	29, 512	9, 606	32, 012	12, 247	33, 252
British Malaya	20	13, 649	27	17, 214	184	19, 233	56	23, 072	13	22, 046
Dutch East Indies	7, 042	15, 773	9, 632	20, 606	10, 376	32, 812	764	19, 413	[2] 7	[2] 73, 299
Germany	19, 192	5, 817	12, 812	17, 512	4, 139	15, 076	2, 355	27, 305	13, 791	41, 956
Australia [1]	173	421	382	413	232	450	255	398	-------	-------
PRINCIPAL IMPORTING COUNTRIES										
United States	224, 763	17, 961	233, 174	17, 901	245, 129	15, 952	293, 370	20, 418	290, 637	24, 653
United Kingdom	52, 886	7, 074	68, 723	5, 914	82, 510	6, 068	91, 349	5, 535	141, 145	9, 072
Belgium [3]	26, 455	7, 218	25, 533	6, 196	32, 118	5, 548	39, 343	3, 627	34, 396	6, 631
Denmark	24, 466	17, 176	38, 321	10, 836	32, 533	17, 859	19, 126	22, 132	23, 539	33, 420
Sweden	19, 037	4, 743	24, 363	3, 503	27, 184	5, 209	28, 162	4, 203	37, 497	2, 791
Egypt	10, 882	0	12, 067	0	10, 200	1	10, 905	2	11, 502	-------
Italy [3]	11, 455	56	6, 807	245	5, 450	42	7, 633	55	12, 679	138
British India	4, 606	1, 064	10, 601	948	1, 892	1, 766	9, 903	948	21, 014	709
Rumania	963	0	1, 869	0	1, 026	0	-------	-------	-------	-------
New Zealand	331	0	720	0	778	0	981	0	814	0
Portuguese-India [1]	8	1	190	0	34	0	10	9	-------	-------
Total 19 countries	415, 982	531, 777	469, 265	539, 130	474, 710	589, 980	526, 976	669, 546	602, 480	773, 296

Bureau of Agricultural Economics. Compiled from official sources.

[1] International Yearbook of Agricultural Statistics.
[2] Java and Madura only.
[3] Includes some other oils.

TABLE 508.—*Crop summary: Acreage, production, and yield per acre, 1927–1929*

Crop	Acreage 1927	Acreage 1928	Acreage 1929	Unit	Production 1927	Production 1928	Production 1929	Yield per acre 1927	Yield per acre 1928	Yield per acre 1929
	1,000 acres	*1,000 acres*	*1,000 acres*		*Thousands*	*Thousands*	*Thousands*			
Corn	98, 393	100, 673	98, 018	Bushel	2, 763, 093	2, 818, 901	2, 622, 189	28. 1	28. 0	26. 8
All wheat	58, 784	58, 272	61, 141	do	878, 374	914, 876	806, 508	14. 9	15. 7	13. 2
Oats	41, 941	41, 734	40, 217	do	1, 182, 594	1, 439, 407	1, 238, 654	28. 2	34. 5	30. 8
Barley	9, 476	12, 598	13, 212	do	265, 882	357, 487	307, 105	28. 1	28. 4	23. 2
Rye	3, 648	3, 480	3, 225	do	58, 164	43, 366	40, 629	15. 9	12. 5	12. 6
Buckwheat	810	749	729	do	15, 755	13, 148	11, 505	19. 5	17. 6	15. 8
Flaxseed	2, 837	2, 675	2, 990	do	25, 847	19, 928	16, 838	9. 1	7. 4	5. 6
Rice	1, 012	977	893	do	44, 774	43, 240	40, 217	44. 2	44. 3	45. 0
Grain sorghums[1]	6, 723	6, 497	5, 921	do	137, 358	142, 513	100, 845	20. 4	21. 9	17. 0
Cotton	40, 138	45, 341	45, 981	Bale	12, 955	14, 478	14, 919	[2] 154. 5	[2] 152. 9	[2] 155. 3
Cottonseed				Ton	5, 759	6, 435	6, 630			
Hay, tame	60, 885	58, 140	60, 996	do	106, 001	93, 351	101, 715	1. 74	1. 61	1. 67
Hay, wild	14, 813	13, 138	14, 125	do	17, 326	12, 915	12, 924	1. 17	. 98	. 91
All hay	75, 698	71, 278	75, 121	do	123, 327	106, 266	114, 639	1. 63	1. 49	1. 53
Cloverseed (red alsike).	1, 214	617	1, 369	Bushel	1, 727	961	2, 157	1. 42	1. 56	1. 58
Beans, dry, edible[1]	1, 571	1, 643	1, 879	do	16, 181	17, 656	19, 337	10. 3	10. 7	10. 3
Soybeans[3]	1, 162	1, 144	1, 373	do	15, 620	16, 256	18, 146	13. 4	14. 2	13. 2
Peanuts[3]	1, 786	1, 930	2, 024	Pound	1, 312, 643	1, 276, 078	1, 360, 277	735. 0	661. 2	672. 1
Cowpeas[3]	1, 826	1, 391	1, 059	Bushel	19, 644	13, 352	10, 149	10. 8	9. 6	9. 6
Velvet beans[3]	1, 534	1, 558	1, 865	Ton	726	713	838	[2] 946. 6	[2] 915. 2	[2] 898. 7
Potatoes	3, 476	3, 837	3, 370	Bushel	402, 741	465, 350	357, 451	115. 9	121. 3	106. 1
Sweet potatoes	933	810	822	do	94, 112	77, 661	84, 661	100. 9	95. 9	103. 0
Tobacco	1, 585	1, 894	2, 016	Pound	1, 211, 909	1, 374, 547	1, 500, 891	764. 7	725. 7	744. 3
Sugar cane, except for sirup (La.).	90	131	190	Ton	1, 178	2, 099	3, 040	13. 2	16. 0	16. 0
Cane sirup	114	110	124	Gallon	20, 839	20, 401	23, 458	182. 8	185. 5	189. 2
Sugar beets	721	644	717	Ton	7, 753	7, 101	7, 672	10. 8	11. 0	10. 7
Sorgo sirup	366	349	346	Gallon	30, 268	27, 152	26, 181	82. 7	77. 8	75. 7
Maple sugar and sirup (as sugar).	[4] 14, 603	[4] 14, 388	[4] 14, 130	Pound	32, 612	26, 373	22, 466	[5] 2. 23	[5] 1. 84	[5] 1. 59
Broomcorn[1]	237	298	284	Ton	40	54	44	[2] 337. 6	[2] 363. 1	[2] 308. 5
Hops[1]	25	26	25	Pound	30, 658	32, 944	33, 220	1, 246. 0	1, 257. 0	1, 334. 0
Fruit crops:										
Apples, total				Bushel	123, 693	186, 893	139, 754			
Apples, commercial.				Barrel	26, 017	35, 461	28, 973			
Peaches				Bushel	[6] 45, 463	[6] 68, 369	45, 998			
Pears				do	18, 373	24, 212	20, 903			
Grapes				Ton	[7] 2, 605	[7] 2, 671	2, 022			
Oranges (2 States).				Box	31, 200	53, 705	33, 100			
Grapefruit (Fla.).				do	7, 200	10, 500	6, 500			
Lemons (Calif.)				do	6, 000	7, 900	5, 900			
Cranberries	28	29	29	Barrel	496	551	542	17. 4	19. 3	19. 0
Commercial truck crops:										
Asparagus	90	97	99	Crate	7, 861	9, 433	9, 887	87. 0	98. 0	100. 0
Beans, snap	110	134	134	Ton	125	146	167	1. 1	1. 1	1. 2
Cabbage	144	137	157	do	1, 221	984	1, 069	8. 5	7. 2	6. 8
Cantaloupes	106	101	107	Crate	15, 014	15, 416	16, 799	142. 0	153. 0	157. 0
Carrots	26	28	31	Bushel	7, 760	7, 524	10, 161	295. 0	273. 0	333. 0
Cauliflower	18	21	25	Crate	4, 173	5, 031	6, 450	232. 0	235. 0	254. 0
Celery	25	27	29	do	7, 585	7, 624	8, 686	309. 0	282. 0	302. 0
Corn, sweet (canning).	223	306	331	Ton	414	593	639	1. 9	1. 9	1. 9
Cucumbers	94	110	112	Bushel	8, 294	8, 656	8, 644	89. 0	79. 0	77. 0
Eggplant	3	4	4	do	814	896	713	263. 0	230. 0	196. 0
Lettuce	123	125	141	Crate	19, 369	18, 382	20, 325	157. 0	147. 0	144. 0
Onions	78	80	87	Bushel	23, 797	20, 454	25, 867	307. 0	256. 0	299. 0
Peas, green	221	267	297	Ton	240	278	288	1. 1	1. 0	. 9
Peppers	15	18	18	Bushel	3, 536	4, 466	4, 103	239. 0	250. 0	230. 0
Potatoes, early[8]	348	401	289	do	44, 827	55, 475	35, 613	129. 0	138. 0	123. 0
Spinach	55	65	73	Ton	141	141	189	2. 6	2. 1	2. 6
Strawberries	191	207	199	Quart	320, 991	334, 331	331, 441	1, 678. 0	1, 616. 0	1, 669. 0
Tomatoes	394	400	434	Ton	1, 628	1, 394	1, 846	4. 1	3. 5	4. 2
Watermelons	183	207	204	Number	57, 682	63, 295	67, 616	316. 0	306. 0	332. 0
Total with duplications eliminated.	357, 206	361, 916	366, 230							

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Principal producing States.
[2] Pounds.
[3] Includes total crop gathered, hogged off, and otherwise utilized, except where harvested for hay only.
[4] Trees tapped.
[5] Per tree.
[6] The production of peaches shown includes some estimated quantities not harvested or not utilized as follows: 1927, 2,708,000 bushels; 1928, 3,917,000 bushels.
[7] The production of grapes includes 142,000 tons not harvested in 1927; 153,000 tons not harvested in 1928.
[8] Included in "Potatoes."

TABLE 509.—*Acreage of 19 crops, by States, average 1920–1924, annual 1925–1929*

State and division	Acreage of 19 crops [1]					
	Average, 1920–1924	1925	1926	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Maine	1, 557	1, 592	1, 591	1, 587	1, 589	1, 568
New Hampshire	520	523	523	519	511	512
Vermont	1, 137	1, 141	1, 141	1, 136	1, 121	1, 124
Massachusetts	568	573	575	568	560	562
Rhode Island	63	61	62	60	59	59
Connecticut	476	481	479	479	476	470
New York	8, 048	7, 841	7, 621	7, 638	7, 397	7, 397
New Jersey	861	708	686	684	681	681
Pennsylvania	7, 689	7, 314	7, 150	7, 129	7, 007	6, 960
North Atlantic	20, 918	20, 234	19, 828	19, 800	19, 401	19, 333
Ohio	11, 255	10, 751	10, 651	10, 402	10, 282	10, 370
Indiana	11, 301	10, 878	10, 641	10, 223	9, 963	10, 078
Illinois	20, 102	20, 131	19, 774	19, 201	19, 788	19, 808
Michigan	8, 703	8, 322	8, 255	8, 282	8, 195	8, 060
Wisconsin	9, 589	9, 534	9, 502	9, 507	9, 455	9, 449
Minnesota	16, 897	17, 923	17, 868	17, 682	17, 469	17, 671
Iowa	21, 027	21, 489	21, 574	21, 368	21, 762	21, 695
Missouri	14, 738	14, 525	13, 997	13, 137	13, 778	13, 280
North Dakota	19, 164	20, 452	19, 453	20, 140	20, 802	20, 678
South Dakota	15, 458	15, 918	13, 629	16, 383	15, 697	16, 996
Nebraska	18, 511	19, 674	19, 486	20, 306	20, 280	20, 802
Kansas	21, 216	21, 594	21, 573	21, 924	22, 879	22, 952
North Central	187, 959	191, 191	186, 403	188, 555	190, 350	191, 839
Delaware	396	344	346	339	344	340
Maryland	1, 773	1, 637	1, 640	1, 654	1, 670	1, 654
Virginia	4, 446	4, 208	4, 232	4, 104	4, 119	3, 988
West Virginia	1, 848	1, 794	1, 744	1, 742	1, 727	1, 724
North Carolina	6, 635	6, 821	6, 960	6, 692	6, 728	6, 735
South Carolina	5, 418	5, 076	4, 982	5, 027	4, 868	4, 661
Georgia	9, 795	9, 009	9, 318	9, 235	9, 101	9, 216
Florida	1, 134	876	851	954	1, 024	1, 042
South Atlantic	31, 445	29, 765	30, 073	29, 747	29, 581	29, 360
Kentucky	5, 747	5, 354	5, 323	5, 151	5, 262	5, 325
Tennessee	6, 513	6, 388	6, 726	6, 278	6, 208	6, 471
Alabama	7, 713	7, 287	7, 369	6, 974	7, 190	7, 286
Mississippi	6, 338	6, 046	6, 232	5, 923	6, 407	6, 454
Arkansas	6, 457	6, 994	7, 073	6, 257	6, 863	6, 912
Louisiana	3, 887	3, 943	4, 014	3, 681	4, 199	4, 172
Oklahoma	14, 625	15, 210	15, 900	14, 719	15, 678	15, 423
Texas	25, 202	26, 546	30, 257	29, 344	30, 059	30, 870
South Central	76, 481	77, 768	82, 894	78, 327	81, 866	82, 913
Montana	6, 223	6, 662	6, 772	7, 457	7, 626	7, 841
Idaho	2, 649	2, 579	2, 616	2, 824	2, 847	2, 828
Wyoming	1, 502	1, 638	1, 670	1, 763	1, 805	1, 868
Colorado	5, 455	5, 608	5, 934	5, 688	5, 881	5, 939
New Mexico	1, 111	904	1, 287	972	1, 213	1, 403
Arizona	488	480	519	543	574	607
Utah	1, 015	992	987	1, 012	1, 037	1, 060
Nevada	384	421	402	405	407	405
Washington	3, 795	3, 486	3, 475	3, 611	3, 602	3, 777
Oregon	2, 734	2, 674	2, 702	2, 758	2, 735	2, 797
California	4, 980	4, 467	4, 587	4, 610	4, 713	4, 735
Far Western	30, 335	29, 911	30, 951	31, 643	32, 440	33, 260
United States	347, 139	348, 869	350, 149	348, 072	353, 638	356, 705

Bureau of Agricultural Economics. Estimates of the crop-reporting board.

[1] Includes corn, wheat, oats, barley, rye, buckwheat, potatoes, sweetpotatoes, tobacco, flax, rice, all hay, cotton, peanuts, grain sorghums, beans, broomcorn, hops, and cranberries.

TABLE 510.—*Farm returns, 1922–1928*

[Averages of reports of owner-operators for their own farms for calendar year]

	United States							North Atlantic		East North Central		West North Central		South Atlantic		South Central		Western	
	1922	1923	1924	1925	1926	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928
Number of reports	6,094	16,183	15,103	15,330	13,475	13,859	11,851	1,477	1,244	2,560	2,343	3,129	2,735	1,837	1,525	3,418	2,757	1,438	1,247
Size of farm—acres	252	298	303	304	315	275	284	139	136	148	144	355	347	189	186	249	277	643	689
Value of farm real estate, Jan. 1	$13,586	$14,530	$14,323	$14,157	$13,379	$12,543	$12,299	$9,405	$8,709	$13,002	$12,353	$19,082	$17,976	$8,231	$8,075	$8,895	$9,298	$14,982	$15,131
Value of farm personalty, Jan. 1	2,844	2,960	2,937	2,965	2,929	2,893	3,118	3,395	3,493	2,889	2,893	4,068	4,320	1,563	1,655	1,817	2,006	4,087	4,770
Receipts:																			
Crop sales	816	850	1,012	993	926	978	946	983	786	605	510	826	911	1,005	901	1,068	1,153	1,721	1,600
Sales of livestock	660	760	780	897	894	851	936	448	494	966	867	1,562	3,711	364	413	444	489	1,104	1,431
Sales of livestock products	454	550	570	585	589	638	689	1,709	1,631	845	934	540	603	343	344	249	274	684	818
Miscellaneous other	42	80	72	76	39	38	37	68	60	36	35	42	42	30	25	21	20	50	59
Total	1,972	2,240	2,434	2,551	2,448	2,505	2,608	3,208	2,971	2,452	2,346	2,970	3,267	1,742	1,683	1,782	1,936	3,559	3,908
Cash outlay:																			
Hired labor	331	350	384	386	386	397	394	568	473	287	281	357	388	367	361	355	353	635	668
Livestock bought	204	240	222	242	242	238	238	210	200	279	183	358	399	137	162	150	145	275	323
Feed bought	175	210	248	244	232	243	262	596	611	258	288	292	290	125	125	98	115	240	302
Fertilizer	57	60	66	69	73	64	67	135	130	55	60	11	10	181	198	46	52	18	14
Seed	43	40	44	47	48	49	46	78	64	51	54	58	55	33	31	34	31	53	49
Taxes on farm property	174	190	192	191	183	180	184	169	163	213	216	235	238	111	114	119	115	245	263
Machinery and tools	123	110	103	119	130	129	151	141	130	131	125	190	255	57	57	74	85	204	254
Miscellaneous other	150	150	151	179	179	157	176	217	191	156	170	173	229	78	89	96	97	312	337
Total	1,257	1,350	1,410	1,477	1,473	1,457	1,518	2,114	1,962	1,430	1,377	1,674	1,864	1,089	1,137	972	993	1,982	2,210
Receipts less cash outlay	715	890	1,024	1,074	975	1,048	1,090	1,094	1,009	1,022	969	1,296	1,403	653	546	810	943	1,577	1,698
Increase in inventory of personal property	202	130	181	223	158	242	244	239	96	66	201	346	395	165	93	170	178	602	473
Net result	917	1,020	1,205	1,297	1,133	1,290	1,334	1,333	1,105	1,088	1,170	1,642	1,798	818	639	980	1,121	2,179	2,171
Interest paid	(1)	230	230	225	215	201	202	109	97	171	177	359	347	84	88	133	137	313	322
Spent for farm improvements	(1)	140	133	131	128	141	126	168	149	142	112	169	149	114	101	119	99	142	169

NONCASH (ESTIMATED) ITEMS

Value of food produced and used on the farm [2]	$294	$265	$266	$274	$282	$273	$269	$286	$267	$266	$268	$284	$290	$307	$298	$256	$245	$247	$452
Value of family labor, including owner [2]	716	870	789	793	779	768	768	941	902	842	837	919	932	489	462	505	514	1, 024	1, 008
Change in value of real estate during the year (minus sign (−) shows decrease)	−52	−66	+145	+173	+2	+61	+72	+66	+64	−23	+26	+71	+52	+74	+27	+58	+79	+171	+257

Bureau of Agricultural Economics. Computed from reports of individual farms operated by their owners. Tables for 1922 in Agriculture Yearbook, 1924, pp. 1131–1132; tables for 1923–24 in Agriculture Yearbook, 1925, pp. 1342–1343; tables for 1925 in Agriculture Yearbook, 1927, pp. 1132–1133; tables for 1926 in Agriculture Yearbook 1928, pp. 1038–1039.

[1] Not reported for 1922.

[2] Averages of farms for which the item was reported.

TABLE 511.—*Farm returns: Proportion of farmers obtaining net results within specified ranges, 1922–1928*

	United States							North Atlantic		East North Central		West North Central		South Atlantic		South Central		Western	
	1922	1923	1924	1925	1926	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928	1927	1928
Number of reports	6, 094	16, 183	15, 103	15, 330	13, 475	13, 859	11, 851	1, 477	1, 244	2, 560	2, 343	3, 129	2, 735	1, 837	1, 525	3, 418	2, 757	1, 438	1, 247
Size of farm ......acres	252	298	303	304	315	275	284	139	136	148	144	355	347	189	186	249	277	643	689
Value of farm property Jan. 1 per farm ......dollars	16, 430	17, 490	17, 260	17, 122	16, 308	15, 436	15, 417	12, 800	12, 202	15, 891	15, 246	23, 150	22, 296	9, 794	9, 730	10, 712	11, 304	19, 069	19, 901
Net result per farm ......do	917	1, 020	1, 205	1, 297	1, 133	1, 290	1, 334	1, 333	1, 105	1, 088	1, 170	1, 642	1, 798	818	639	980	1, 121	2, 179	2, 171
Proportion obtaining:	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
$5,000 or more	1. 77	1. 88	2. 69	3. 00	2. 29	3. 19	3. 12	2. 91	1. 53	1. 25	1. 58	4. 67	5. 30	1. 20	0. 92	1. 90	1. 96	9. 32	8. 10
$3,000 to $4,999	3. 89	4. 67	6. 10	6. 82	5. 49	6. 42	6. 77	7. 38	5. 55	4. 49	4. 78	10. 00	12. 29	2. 78	1. 57	4. 33	4. 50	10. 64	10. 99
$2,500 to $2,999	2. 51	2. 88	3. 61	4. 03	3. 59	3. 86	4. 06	4. 67	4. 18	3. 40	3. 59	5. 94	6. 25	2. 07	1. 77	2. 34	3. 01	5. 21	5. 13
$2,000 to $2,499	4. 33	5. 13	5. 99	6. 26	5. 46	6. 53	6. 35	7. 52	6. 43	7. 07	6. 70	8. 82	8. 30	3. 86	2. 36	4. 50	4. 93	7. 79	9. 38
$1,500 to $1,999	7. 78	8. 91	9. 30	9. 92	9. 05	9. 58	10. 35	11. 04	10. 69	10. 08	11. 40	12. 05	13. 42	6. 59	5. 57	7. 26	7. 76	11. 20	12. 83
$1,000 to $1,499	14. 39	14. 49	15. 13	15. 44	14. 09	15. 46	15. 23	16. 66	14. 55	17. 42	17. 41	16. 23	17. 55	13. 55	10. 62	13. 63	14. 07	15. 85	14. 92
$500 to $999	22. 82	23. 07	21. 86	21. 79	22. 10	22. 07	22. 07	20. 11	22. 35	23. 87	25. 18	19. 34	17. 92	23. 79	24. 13	25. 25	24. 81	17. 11	16. 52
$0 to $499	27. 98	26. 09	24. 68	22. 32	26. 43	23. 98	23. 19	19. 90	23. 55	23. 01	21. 60	15. 79	13. 46	34. 40	34. 76	31. 77	30. 76	15. 92	16. 28
$0 to −$499	9. 89	9. 10	7. 85	7. 81	8. 56	6. 68	7. 20	7. 51	8. 84	7. 07	6. 44	4. 38	3. 98	9. 74	15. 08	7. 11	7. 11	5. 15	4. 57
−$500 to −$999	2. 36	2. 07	1. 57	1. 54	1. 69	1. 28	1. 04	1. 35	1. 61	1. 48	. 94	1. 50	. 95	1. 31	1. 97	. 97	. 55	1. 11	. 88
−$1,000 or more	2. 28	1. 71	1. 22	1. 07	1. 25	. 95	. 62	. 95	. 72	. 86	. 38	1. 28	. 58	. 71	1. 25	. 94	. 54	. 70	. 40
	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00	100. 00

Bureau of Agricultural Economics. The reports are those tabulated in Table 510 [preceding]. For distribution by geographical divisions, 1925 and 1926, see Table 476, Yearbook, 1927, and Table 509, Yearbook, 1928.

TABLE 512.—*Gross value of farm production, 1924–1928*

State	Crops					Animal products				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	61,614	105,152	83,653	76,707	54,254	31,897	32,093	31,999	31,853	30,931
New Hampshire	22,617	24,901	22,204	20,893	19,909	19,311	19,413	20,010	19,474	20,618
Vermont	45,164	43,976	41,988	38,621	36,251	35,214	40,763	39,765	41,851	41,338
Massachusetts	49,185	53,524	50,647	49,111	49,107	41,334	41,394	43,282	41,824	42,139
Rhode Island	5,482	5,709	5,686	5,046	4,841	6,156	6,796	6,661	6,356	6,732
Connecticut	39,699	39,613	39,144	37,939	38,137	30,644	32,890	35,039	34,680	35,787
New York	312,164	330,359	296,753	276,084	260,587	226,578	249,345	249,515	267,024	280,588
New Jersey	84,101	79,832	74,406	77,828	70,256	41,796	45,938	47,194	47,797	49,852
Pennsylvania	282,901	299,258	271,561	264,865	240,720	183,527	203,909	215,088	220,935	225,564
Ohio	334,247	331,856	325,685	304,427	296,937	244,496	284,590	286,746	278,183	279,601
Indiana	281,169	270,082	262,864	251,494	255,695	203,103	230,508	246,454	238,043	245,229
Illinois	571,972	493,422	456,165	441,843	507,877	315,697	365,355	380,369	352,400	348,283
Michigan	260,133	255,105	242,084	232,745	237,315	164,158	182,683	164,054	190,294	190,553
Wisconsin	287,534	313,649	295,866	295,102	287,976	271,525	319,753	346,619	353,726	341,444
Minnesota	397,878	356,464	334,650	336,685	327,396	264,627	322,931	346,029	320,240	341,603
Iowa	536,947	499,850	499,264	532,427	555,275	486,103	570,400	610,245	569,401	574,210
Missouri	364,902	339,542	306,163	311,162	309,755	246,906	295,298	311,432	297,227	306,666
North Dakota	343,119	278,447	192,880	281,798	241,946	71,684	87,820	89,958	82,509	87,497
South Dakota	245,143	187,135	127,742	259,386	173,491	133,773	160,125	163,548	150,708	160,111
Nebraska	374,678	319,074	265,660	421,041	342,671	245,049	303,846	303,551	284,542	296,350
Kansas	433,898	299,725	328,207	386,528	400,628	209,162	239,690	237,244	237,938	260,567
Delaware	19,346	19,100	16,852	18,700	20,099	7,920	8,772	9,393	9,537	9,957
Maryland	80,079	84,295	84,055	86,515	69,482	39,921	43,386	43,461	46,914	48,114
Virginia	212,595	184,128	198,331	215,039	202,004	77,689	79,134	81,359	89,519	93,375
West Virginia	84,397	85,557	84,053	81,500	82,616	42,998	46,790	51,122	52,582	55,287
North Carolina	361,407	376,911	370,082	390,590	359,212	72,246	76,859	81,649	80,751	78,705
South Carolina	197,877	186,604	173,598	190,115	167,123	35,961	34,938	36,425	37,108	36,550
Georgia	297,755	281,678	266,618	299,182	267,092	67,708	74,099	79,277	78,822	74,032
Florida	106,460	104,564	94,812	100,713	113,602	19,217	20,540	22,765	21,228	20,495
Kentucky	239,354	216,560	207,064	210,925	229,246	108,262	110,245	119,167	122,122	114,939
Tennessee	244,451	222,151	219,873	229,446	229,060	81,609	93,497	102,369	101,397	98,919
Alabama	252,286	266,465	225,667	265,472	228,781	54,011	59,049	64,602	57,118	54,354
Mississippi	232,756	334,121	239,506	267,247	248,746	49,061	51,462	55,106	56,275	54,733
Arkansas	257,572	255,971	213,278	222,036	232,028	53,088	59,420	65,929	62,866	59,863
Louisiana	150,953	200,387	151,939	157,989	167,747	31,695	33,569	34,005	31,956	31,776
Oklahoma	395,365	309,577	313,023	301,495	309,460	89,626	108,286	115,964	124,425	131,908
Texas	915,887	662,499	706,404	791,860	808,134	192,690	213,720	232,364	247,871	263,164
Montana	123,802	106,047	107,020	158,835	123,740	57,654	71,190	71,906	68,288	82,338
Idaho	82,540	119,412	91,808	113,927	96,398	46,968	55,410	55,136	53,841	61,427
Wyoming	28,808	31,897	30,061	32,248	34,097	35,157	40,012	40,555	41,247	50,215
Colorado	127,372	135,384	120,671	132,212	117,463	67,867	77,846	79,095	81,786	89,811

New Mexico	36, 526	26, 677	30, 712	26, 618	30, 540	30, 499	29, 992	34, 847	37, 134	39, 328
Arizona	34, 796	36, 140	31, 529	39, 569	49, 326	20, 647	19, 195	21, 147	23, 159	22, 940
Utah	36, 446	52, 516	38, 418	42, 558	42, 441	33, 663	36, 929	38, 378	38, 193	43, 698
Nevada	9, 154	11, 421	8, 274	7, 811	8, 365	15, 990	16, 370	16, 902	15, 475	17, 290
Washington	128, 765	170, 503	151, 120	172, 983	150, 418	62, 663	73, 704	72, 500	75, 058	80, 312
Oregon	81, 723	99, 305	92, 847	102, 652	96, 075	58, 923	67, 399	68, 385	67, 753	74, 307
California	440, 243	483, 314	470, 614	510, 612	532, 503	157, 109	181, 871	186, 022	190, 351	201, 384
United States	10, 513, 262	9, 989, 859	9, 261, 501	10, 070, 581	9, 726, 822	5, 083, 582	5, 819, 224	6, 054, 632	5, 979, 781	6, 154, 884

Bureau of Agricultural Economics. Estimated quantities produced by States, times weighted annual prices, by States. Commodities included are those shown in Table 516.

TABLE 513.—*Gross income from farm production, 1924–1928*

State	Crops, gross					Animal production				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	37, 877	73, 985	55, 449	48, 809	30, 938	31, 142	31, 307	31, 176	31, 110	30, 058
New Hampshire	11, 386	12, 852	11, 772	10, 998	10, 035	19, 078	19, 017	19, 519	18, 733	19, 953
Vermont	16, 159	16, 655	16, 471	17, 040	14, 036	34, 974	39, 723	38, 625	40, 474	40, 440
Massachusetts	33, 384	37, 247	35, 181	34, 021	34, 243	40, 226	39, 891	41, 503	39, 814	40, 507
Rhode Island	3, 385	3, 850	3, 738	3, 220	3, 094	5, 993	6, 337	6, 460	5, 993	6, 418
Connecticut	26, 908	25, 584	27, 306	24, 997	25, 891	29, 876	31, 958	34, 154	33, 433	34, 269
New York	170, 846	188, 617	164, 198	153, 091	149, 073	221, 120	240, 257	239, 333	251, 460	267, 250
New Jersey	64, 510	63, 810	58, 381	62, 284	54, 867	41, 094	44, 175	45, 155	45, 388	47, 688
Pennsylvania	128, 126	156, 443	132, 589	123, 327	112, 791	184, 692	199, 381	207, 199	207, 553	217, 724
Ohio	157, 218	161, 562	161, 944	135, 144	114, 985	245, 484	273, 988	278, 947	269, 197	276, 285
Indiana	118, 994	127, 235	125, 424	95, 119	89, 359	209, 489	228, 477	235, 562	228, 990	243, 005
Illinois	285, 583	262, 235	226, 243	202, 901	246, 652	324, 249	365, 722	372, 375	351, 215	346, 859
Michigan	131, 141	136, 365	121, 262	114, 356	114, 887	162, 170	173, 222	183, 032	182, 997	186, 221
Wisconsin	78, 993	102, 329	89, 668	81, 019	75, 869	266, 793	307, 283	336, 043	348, 397	339, 355
Minnesota	170, 259	158, 359	125, 315	114, 689	115, 803	258, 421	313, 349	331, 754	311, 250	334, 069
Iowa	132, 060	147, 923	135, 231	122, 490	166, 896	512, 653	573, 200	609, 409	569, 138	562, 417
Missouri	141, 460	149, 484	116, 511	115, 507	116, 433	262, 944	294, 474	310, 081	292, 833	303, 895
North Dakota	231, 809	187, 876	113, 794	188, 200	158, 340	68, 724	87, 312	95, 560	80, 651	86, 028
South Dakota	100, 213	76, 129	31, 377	108, 221	64, 051	137, 401	173, 867	176, 136	140, 604	160, 897
Nebraska	152, 582	116, 384	89, 688	182, 705	133, 141	265, 879	311, 545	327, 058	269, 997	299, 118
Kansas	261, 949	150, 442	203, 247	205, 158	233, 779	211, 853	250, 974	254, 304	220, 972	247, 317
Delaware	12, 747	13, 420	11, 299	12, 305	13, 803	7, 700	8, 229	8, 951	9, 063	9, 477
Maryland	49, 521	56, 338	55, 686	55, 566	41, 315	38, 615	41, 342	40, 807	43, 726	45, 564
Virginia	141, 471	129, 995	134, 112	141, 521	130, 120	77, 319	80, 626	79, 884	84, 615	90, 002
West Virginia	43, 142	42, 629	44, 498	42, 299	43, 583	43, 069	48, 456	52, 252	50, 281	53, 794
North Carolina	276, 954	306, 306	295, 956	308, 065	282, 636	73, 572	77, 591	81, 275	78, 538	81, 853
South Carolina	153, 620	153, 579	136, 116	142, 504	128, 101	38, 821	37, 230	36, 081	36, 080	37, 104
Georgia	218, 016	218, 288	194, 914	216, 283	193, 789	70, 566	77, 478	77, 773	76, 305	76, 721
Florida	94, 314	93, 056	84, 526	89, 652	103, 343	21, 248	20, 990	23, 214	21, 660	22, 558
Kentucky	131, 747	126, 983	104, 550	102, 149	130, 888	102, 496	112, 691	116, 993	118, 820	117, 520
Tennessee	145, 758	144, 218	128, 529	131, 892	134, 534	83, 633	97, 349	99, 998	98, 470	100, 492
Alabama	187, 127	207, 258	167, 401	196, 951	173, 547	56, 759	60, 264	62, 969	55, 465	55, 322
Mississippi	187, 344	281, 684	191, 026	211, 985	205, 222	50, 765	52, 380	53, 972	53, 715	56, 819
Arkansas	198, 282	210, 560	158, 068	168, 352	181, 847	53, 475	58, 102	63, 997	61, 603	60, 418
Louisiana	121, 994	168, 784	125, 278	128, 305	136, 088	31, 360	34, 515	33, 070	32, 669	30, 944
Oklahoma	295, 245	246, 835	233, 574	204, 414	220, 000	87, 702	111, 085	104, 779	118, 065	129, 368
Texas	740, 878	558, 246	549, 260	625, 276	640, 733	197, 092	219, 541	219, 851	243, 817	256, 422
Montana	75, 371	61, 283	64, 517	99, 804	76, 963	56, 546	70, 012	76, 730	62, 981	77, 477
Idaho	47, 222	80, 608	58, 415	76, 037	60, 372	48, 062	55, 276	52, 580	51, 454	60, 651
Wyoming	10, 909	13, 340	13, 301	14, 931	14, 108	34, 324	38, 201	38, 839	39, 379	47, 317
Colorado	75, 416	79, 824	80, 604	82, 285	66, 411	68, 493	81, 154	83, 121	77, 644	88, 685

New Mexico	23, 036	17, 495	21, 071	17, 834	20, 384	31, 008	33, 259	33, 628	41, 753	43, 229
Arizona	27, 322	28, 513	25, 099	31, 355	40, 490	22, 223	25, 344	24, 245	29, 249	30, 422
Utah	21, 193	34, 048	23, 234	24, 750	25, 239	35, 028	36, 051	36, 663	37, 023	42, 175
Nevada	2, 959	3, 714	2, 577	2, 461	2, 980	16, 338	16, 557	18, 365	15, 691	17, 886
Washington	94, 149	130, 258	113, 217	132, 580	111, 696	60, 388	72, 909	70, 881	72, 323	77, 979
Oregon	53, 648	67, 076	65, 149	71, 016	63, 222	58, 540	68, 731	67, 311	66, 041	72, 283
California	361, 564	400, 767	404, 610	446, 080	456, 907	166, 543	180, 247	179, 445	180, 690	197, 970
United States	6, 245, 791	6, 230, 471	5, 531, 376	5, 919, 948	5, 757, 484	5, 165, 940	5, 821, 049	6, 011, 059	5, 797, 349	6, 070, 225

Bureau of Agricultural Economics. Estimated quantities sold and consumed in farm households, by States, times weighted annual prices, by States. Commodities included are those shown in Table 516.

TABLE 514.—*Gross income and cash income from farm production, 1924–1928*

State	Gross income—Crops and animal products					Cash income—Crops and animal products				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
	1,000 dolls.	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Maine	69, 019	105, 292	86, 625	78, 919	60, 996	55, 142	89, 770	71, 908	65, 660	47, 155
New Hampshire	30, 464	31, 869	31, 291	29, 731	29, 988	24, 769	25, 566	25, 515	23, 962	24, 212
Vermont	51, 133	56, 378	55, 096	57, 514	54, 476	43, 358	47, 533	46, 586	48, 979	46, 220
Massachusetts	73, 610	77, 138	76, 684	73, 835	74, 750	63, 609	65, 885	65, 993	63, 106	64, 131
Rhode Island	9, 378	10, 187	10, 198	9, 213	9, 512	8, 097	8, 984	8, 878	8, 005	8, 269
Connecticut	56, 784	57, 542	61, 460	58, 430	60, 160	48, 751	48, 544	52, 904	50, 023	51, 187
New York	391, 966	428, 874	403, 531	404, 551	416, 323	342, 352	370, 593	349, 896	350, 677	363, 695
New Jersey	105, 604	107, 985	103, 536	107, 672	102, 555	97, 034	97, 812	93, 815	98, 026	92, 877
Pennsylvania	312, 818	355, 824	339, 788	330, 880	330, 515	244, 943	278, 207	267, 499	259, 730	261, 103
Ohio	402, 702	435, 550	440, 891	404, 341	391, 270	330, 328	354, 210	361, 848	329, 370	317, 264
Indiana	328, 483	355, 712	360, 986	324, 109	332, 364	276, 251	294, 620	301, 202	269, 650	277, 676
Illinois	609, 832	627, 957	598, 618	554, 146	593, 511	542, 039	554, 032	522, 481	483, 762	525, 145
Michigan	293, 311	309, 587	304, 294	297, 353	301, 108	243, 320	250, 142	250, 146	244, 805	250, 416
Wisconsin	345, 786	409, 612	425, 711	429, 416	415, 224	297, 946	350, 155	370, 478	376, 274	364, 833
Minnesota	428, 680	471, 708	457, 069	425, 939	449, 872	379, 683	412, 237	401, 675	372, 045	394, 983
Iowa	644, 713	721, 123	744, 640	691, 628	729, 313	584, 919	651, 043	674, 000	625, 229	663, 947
Missouri	404, 404	443, 958	426, 592	408, 340	414, 328	325, 874	356, 859	340, 567	326, 523	333, 552
North Dakota	300, 533	275, 188	209, 354	268, 851	244, 368	279, 928	250, 882	185, 231	246, 035	222, 371
South Dakota	237, 614	249, 996	207, 513	248, 825	224, 948	217, 835	226, 855	185, 187	227, 172	202, 826
Nebraska	418, 461	427, 929	416, 746	452, 702	432, 259	385, 611	389, 225	379, 268	416, 707	396, 197
Kansas	473, 802	401, 416	457, 551	426, 130	481, 096	433, 017	356, 069	412, 938	382, 432	438, 436
Delaware	20, 447	21, 649	20, 250	21, 368	23, 280	17, 416	18, 198	17, 032	18, 202	17, 153
Maryland	88, 136	97, 680	96, 493	99, 292	86, 879	71, 404	79, 016	78, 938	81, 800	69, 962
Virginia	218, 790	210, 621	213, 996	226, 136	220, 122	154, 423	148, 220	151, 809	162, 981	153, 294
West Virginia	86, 211	91, 085	96, 750	92, 580	97, 377	51, 181	55, 274	60, 482	57, 223	62, 124
North Carolina	350, 526	383, 877	377, 231	386, 603	364, 489	264, 820	294, 952	289, 300	302, 449	276, 876
South Carolina	192, 441	190, 809	172, 197	178, 584	165, 205	143, 733	142, 218	124, 522	130, 969	116, 596
Georgia	288, 582	295, 766	272, 687	292, 588	270, 510	207, 874	209, 149	189, 893	214, 514	192, 583
Florida	115, 562	114, 046	107, 740	111, 312	125, 901	103, 061	101, 008	94, 726	99, 389	113, 837
Kentucky	234, 243	239, 674	221, 543	220, 969	248, 408	163, 455	163, 082	146, 528	151, 067	177, 118
Tennessee	229, 391	241, 567	228, 527	230, 362	235, 026	157, 734	163, 597	152, 050	157, 545	161, 338
Alabama	243, 886	267, 522	230, 370	252, 416	228, 869	175, 849	194, 210	158, 718	188, 316	164, 308
Mississippi	238, 109	334, 064	244, 998	265, 700	262, 041	184, 142	278, 786	191, 497	213, 941	209, 356
Arkansas	251, 757	268, 662	222, 065	229, 955	242, 265	197, 486	210, 225	163, 893	176, 384	188, 000
Louisiana	153, 354	203, 299	158, 348	160, 974	167, 032	122, 258	171, 803	129, 951	136, 038	139, 551
Oklahoma	382, 947	357, 920	338, 353	322, 479	349, 368	334, 960	303, 078	288, 659	272, 190	300, 377
Texas	937, 970	777, 787	769, 111	869, 093	897, 155	841, 214	667, 600	662, 373	767, 710	793, 391
Montana	131, 917	131, 295	141, 247	162, 785	154, 440	121, 045	118, 659	129, 318	150, 988	142, 504
Idaho	95, 284	135, 884	110, 995	127, 491	121, 023	86, 030	125, 572	101, 437	117, 937	111, 456
Wyoming	45, 233	51, 541	52, 140	54, 310	61, 425	41, 636	47, 537	48, 165	50, 442	57, 410
Colorado	143, 909	160, 978	163, 725	159, 929	155, 096	131, 468	147, 061	149, 999	146, 602	142, 061
New Mexico	54, 044	50, 754	54, 699	59, 587	63, 613	48, 213	44, 768	48, 699	53, 808	58, 058

Arizona	49, 545	53, 857	49, 344	60, 604	70, 912	46, 214	50, 325	45, 331	56, 394	66, 610
Utah	56, 221	70, 099	59, 897	61, 773	67, 414	50, 836	63, 757	54, 331	56, 184	61, 615
Nevada	19, 297	20, 271	20, 942	18, 152	20, 866	18, 161	18, 980	19, 692	16, 995	19, 594
Washington	154, 537	203, 167	184, 098	204, 903	189, 675	137, 595	184, 449	167, 252	188, 128	172, 679
Oregon	112, 188	135, 807	132, 460	137, 057	135, 505	99, 052	121, 128	119, 050	124, 062	122, 167
California	528, 107	581, 014	584, 055	626, 770	654, 877	507, 555	558, 540	563, 347	606, 051	635, 042
United States	11, 411, 731	12, 051, 520	11, 542, 435	11, 717, 297	11, 827, 709	9, 703, 021	10, 160, 415	9, 715, 007	9, 966, 481	10, 071, 555

Bureau of Agricultural Economics. Estimated quantities sold, by States, times weighted annual prices, by States. Gross income equals cash income plus value of quantities consumed in farm households times weighted annual prices. Commodities included are those shown in Table 516.

TABLE 515.—*Cash income from farm production, 1924–1928*

State	Crops					Animal production				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Maine	30,402	64,993	47,346	41,229	23,576	24,740	24,777	24,562	24,431	23,579
New Hampshire	8,105	9,023	8,525	7,786	6,837	16,664	16,543	16,990	16,176	17,375
Vermont	11,385	11,095	11,320	12,026	9,279	31,973	36,438	35,266	36,953	36,941
Massachusetts	27,773	31,179	29,714	28,607	28,693	35,236	34,706	36,279	34,499	35,438
Rhode Island	2,773	3,203	3,173	2,661	2,520	5,324	5,781	5,705	5,344	5,749
Connecticut	23,043	21,038	23,250	21,113	22,002	25,708	27,506	29,654	28,910	29,185
New York	148,626	160,231	139,987	129,217	126,454	193,726	210,362	209,909	221,460	237,241
New Jersey	60,973	59,030	53,942	58,056	50,516	36,061	38,782	39,873	39,970	42,361
Pennsylvania	96,023	119,687	100,112	92,242	82,083	148,920	158,520	167,387	167,488	179,020
Ohio	129,375	131,307	133,849	108,456	88,382	200,953	222,903	227,999	220,914	228,882
Indiana	101,721	107,904	107,578	78,846	72,630	174,530	186,716	193,624	190,804	205,046
Illinois	263,447	240,880	202,558	181,960	226,167	278,592	313,152	319,923	301,802	298,978
Michigan	108,301	106,870	96,385	90,851	92,148	135,019	143,272	153,761	153,954	158,268
Wisconsin	56,866	73,211	64,764	57,646	54,202	241,080	276,944	305,714	318,628	310,631
Minnesota	153,298	135,989	105,622	97,132	98,107	226,385	276,248	296,053	274,913	296,876
Iowa	114,170	126,310	113,659	103,622	148,874	470,749	524,733	560,341	521,607	515,073
Missouri	111,137	118,377	86,239	86,701	82,432	214,737	238,482	254,328	239,822	251,120
North Dakota	226,786	181,959	108,373	183,569	153,994	53,142	68,923	76,858	62,466	68,377
South Dakota	95,541	70,717	26,474	103,988	59,519	122,294	156,138	158,713	123,184	143,307
Nebraska	144,374	105,939	80,738	174,304	125,169	241,237	283,286	298,530	242,403	271,028
Kansas	251,280	139,583	192,791	195,050	224,523	181,737	216,486	220,147	187,382	213,913
Delaware	11,220	11,603	9,810	10,800	9,346	6,196	6,595	7,222	7,402	7,807
Maryland	41,974	48,036	48,146	48,451	34,120	29,430	30,980	30,792	33,349	35,842
Virginia	110,410	101,597	106,346	114,525	101,004	44,013	46,623	45,463	48,456	52,290
West Virginia	24,336	23,960	27,134	25,313	26,629	26,845	31,314	33,348	31,910	35,495
North Carolina	237,623	267,190	257,527	272,301	244,375	27,197	27,762	31,773	30,148	32,501
South Carolina	129,943	131,380	115,037	122,538	106,975	13,790	10,838	9,485	8,431	9,621
Georgia	184,585	183,408	162,544	185,697	161,320	23,289	25,741	27,349	28,817	31,263
Florida	87,959	86,891	78,771	84,031	97,660	15,102	14,117	15,955	15,358	16,177
Kentucky	103,912	98,771	77,406	76,969	103,299	59,543	64,311	69,122	74,098	73,819
Tennessee	114,343	113,708	99,371	104,442	104,138	43,391	49,889	52,679	53,103	57,200
Alabama	157,825	176,652	139,151	170,038	145,042	18,024	17,558	19,567	18,278	19,266
Mississippi	163,397	257,941	168,614	190,281	181,721	20,745	20,845	22,883	23,660	27,635
Arkansas	174,937	186,641	135,391	146,648	158,630	22,549	23,584	28,502	29,736	29,370
Louisiana	107,178	154,953	113,643	117,443	124,454	15,080	16,850	16,308	18,595	15,097
Oklahoma	281,541	233,186	220,933	191,923	207,010	53,419	69,892	67,726	80,267	93,367
Texas	712,811	530,071	522,133	600,095	613,325	128,403	137,529	140,240	167,615	180,066
Montana	72,028	57,724	61,468	97,124	74,120	49,017	60,935	67,850	53,864	68,384
Idaho	43,621	77,011	55,300	73,131	57,142	42,409	48,561	46,137	44,806	54,314
Wyoming	9,863	12,314	12,352	14,047	13,144	31,773	35,223	35,813	36,395	44,266
Colorado	72,371	76,495	77,659	79,508	63,580	59,097	70,566	72,340	67,094	78,481

New Mexico	21, 505	15, 821	19, 613	16, 515	19, 018	26, 708	28, 947	29, 086	37, 293	39, 040
Arizona	26, 547	27, 590	23, 963	30, 046	39, 059	19, 667	22, 735	21, 368	26, 348	27, 551
Utah	19, 266	31, 602	21, 405	22, 969	23, 210	31, 570	32, 155	32, 926	33, 215	38, 405
Nevada	2, 782	3, 504	2, 445	2, 346	2, 821	15, 379	15, 476	17, 247	14, 649	16, 773
Washington	86, 597	122, 234	106, 345	125, 648	104, 716	50, 998	62, 215	60, 907	62, 480	67, 963
Oregon	47, 612	60, 744	59, 520	65, 721	57, 608	51, 440	60, 384	59, 530	58, 341	64, 559
California	354, 522	393, 604	397, 914	439, 430	450, 241	153, 033	164, 936	165, 433	166, 621	184, 801
United States	5, 566, 107	5, 503, 156	4, 856, 340	5, 283, 042	5, 101, 814	4, 136, 914	4, 657, 259	4, 858, 667	4, 683, 439	4, 969, 741

Bureau of Agricultural Economics. Estimated quantities sold, by States, times weighted annual prices, by States. Commodities included are those shown in Table 516.

TABLE 516.—*Gross value, gross income, and cash income from farm production, United States, 1924–1928*

Products	Gross value					Gross income					Cash income				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
CROPS	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*	*1,000 dolls.*
Corn	2,438,945	2,046,550	2,023,242	2,365,302	2,341,462	429,061	386,482	324,312	408,124	423,417	397,614	362,152	302,692	382,224	396,056
Wheat	1,082,931	972,481	1,014,854	1,047,127	900,754	925,383	804,175	861,799	875,486	764,621	911,316	788,599	848,505	862,173	752,642
Oats	719,653	584,482	506,687	563,119	597,480	217,498	150,428	117,264	116,180	146,696	217,498	150,428	117,264	116,180	146,696
Barley	133,946	131,655	107,602	183,999	204,751	61,842	55,385	36,767	72,920	84,401	61,842	55,385	36,767	72,920	84,401
Rye	62,728	37,585	34,401	49,068	36,002	50,297	27,903	24,119	38,621	26,730	49,886	27,531	23,773	38,248	26,337
Buckwheat	14,341	12,235	11,002	13,318	11,794	10,769	9,480	8,132	10,507	8,851	9,729	8,526	7,296	9,670	7,992
Rice	44,564	49,268	45,621	42,168	37,319	41,698	45,231	42,395	40,558	35,844	41,542	45,179	42,356	40,549	35,836
Grain sorghums	99,766	80,251	74,065	104,712	93,433	16,694	12,135	14,360	28,072	18,749	16,694	12,135	14,360	28,072	18,749
Emmer and spelt	3,191	2,313	1,278	3,213	2,450	276	190	82	269	196	276	190	82	269	196
Popcorn	1,285	3,676	1,651	1,181	1,303	1,285	3,676	1,651	1,181	1,303	1,285	3,676	1,651	1,181	1,303
Cotton lint	1,561,025	1,577,396	1,121,222	1,314,093	1,300,502	1,561,025	1,577,396	1,121,222	1,314,093	1,300,502	1,561,025	1,577,396	1,121,222	1,314,093	1,300,502
Cottonseed	206,190	220,381	172,134	206,971	227,895	148,613	162,543	130,027	156,157	170,974	148,613	162,543	130,027	156,157	170,974
Tobacco	259,139	250,774	236,702	256,875	276,448	259,139	250,774	236,702	256,875	276,448	259,139	250,774	236,702	256,875	276,448
Potatoes, white	315,290	531,689	500,743	456,456	293,679	257,868	430,685	409,185	382,890	234,380	196,284	337,253	324,204	309,554	189,059
Sweetpotatoes	82,068	103,941	98,483	102,588	88,675	79,644	101,212	96,239	100,817	86,730	53,062	72,352	75,054	81,027	66,735
Truck crops	302,671	346,833	287,597	308,231	326,926	302,671	346,833	287,597	308,231	326,926	279,032	317,633	266,930	286,114	301,599
Hay	1,413,193	1,254,585	1,268,419	1,284,620	1,182,960	236,131	204,045	192,622	179,989	178,638	236,131	204,045	192,622	179,989	178,638
Sweet sorghum forage	32,610	28,226	29,973	36,280	28,748	3,053	2,373	2,782	3,534	2,852	3,053	2,373	2,782	3,534	2,852
Flaxseed	68,725	50,746	39,252	49,737	37,316	65,191	47,253	36,163	46,943	34,297	65,191	47,253	36,163	46,943	34,297
Broom corn	7,454	4,219	4,285	4,212	4,850	7,454	4,219	4,285	4,212	4,850	7,454	4,219	4,285	4,212	4,850
Hemp	71	224	195	112	116	71	224	195	112	116	71	224	195	112	116
Hops	3,415	6,232	7,296	7,024	6,328	3,415	6,232	7,296	7,024	6,328	3,415	6,232	7,296	7,024	6,328
Alfalfa seed	11,231	11,825	9,645	8,315	7,026	10,246	10,822	8,608	7,365	5,975	10,246	10,822	8,608	7,365	5,975
Clover seed, red and alsike	13,311	16,206	13,181	27,527	18,399	10,515	13,346	9,778	24,558	15,277	10,515	13,346	9,778	24,558	15,277
Clover seed, sweet and jap.	5,868	5,903	8,817	6,327	4,168	3,941	4,229	6,486	4,694	2,966	3,941	4,229	6,486	4,694	2,966
Timothy seed	8,828	6,561	6,834	5,424	2,977	8,373	6,101	6,460	5,173	2,712	8,373	6,101	6,460	5,173	2,712
Field beans	49,280	52,470	41,383	50,346	68,181	44,484	48,324	38,041	45,964	62,395	44,096	48,030	37,798	45,552	61,865
Soybeans	23,147	23,431	21,808	28,050	29,944	7,034	5,958	5,843	6,510	6,447	7,034	5,958	5,843	6,510	6,447
Cow peas	31,317	34,552	28,843	36,866	26,768	4,749	4,439	3,773	4,272	3,065	3,239	2,853	2,570	3,276	1,991
Peanuts	44,433	39,480	33,376	47,122	39,213	39,883	35,732	29,304	42,015	34,435	38,807	34,766	28,432	41,069	33,548
Velvet beans	13,545	9,636	11,991	14,520	14,805										
Apples	206,450	215,050	211,896	173,744	200,582	198,644	207,785	199,066	168,929	193,189	160,627	169,233	161,434	131,829	154,452
Peaches	68,084	64,171	68,426	50,494	63,649	65,713	62,506	64,667	49,164	60,253	49,800	48,728	49,838	39,424	44,941
Pears	26,689	29,066	22,399	24,298	24,167	25,890	28,196	21,508	23,569	23,503	21,090	23,257	17,242	19,707	19,624
Grapes	70,251	66,168	64,603	65,332	49,601	69,134	65,299	63,621	64,493	48,160	64,741	61,330	60,208	61,180	45,062
Cranberries	5,485	6,370	5,623	6,089	7,743	5,485	6,370	5,623	6,089	7,743	5,485	6,370	5,623	6,089	7,743
Strawberries	53,859	50,512	58,373	59,179	53,711	53,859	50,512	58,373	59,179	53,711	53,348	49,830	57,759	58,613	53,186
Other berries	28,109	28,311	32,615	36,857	31,881	28,109	28,311	32,615	36,857	31,881	27,687	27,734	32,129	36,385	31,437
Pecans	4,649	7,030	9,772	4,592	4,030	4,649	7,030	9,772	4,592	4,030	3,834	5,962	8,680	3,684	3,602
Oranges	91,338	89,864	104,082	118,313	142,285	91,338	89,864	104,082	118,313	142,285	90,725	89,337	103,587	117,576	141,685

Grapefruit	7,620	16,855	11,146	19,456	18,901	7,620	16,855	11,146	19,456	18,901	7,542	16,739	11,068	19,321	18,791
Other fruits	64,818	63,463	79,285	74,605	81,931	64,510	63,283	78,816	74,468	81,466	60,007	58,903	73,803	70,719	76,966
Other nuts	12,942	19,080	12,450	20,958	15,818	12,942	19,080	12,450	20,958	15,818	12,837	18,526	12,342	20,870	15,714
Maple sirup and sugar	9,283	7,629	9,802	9,166	7,526	9,283	7,629	9,802	9,166	7,526	8,093	6,658	8,508	8,028	6,608
Sugar beets	59,524	47,137	54,964	59,455	50,960	59,524	47,137	54,964	59,455	50,960	59,524	47,137	54,964	59,455	50,960
Sugar cane and sirup	27,344	33,836	24,802	24,219	24,669	24,341	29,525	20,376	19,855	20,786	12,085	16,930	10,171	9,955	12,291
Sorghum sirup	23,579	23,646	29,080	25,716	24,683	17,370	17,399	21,405	18,854	18,138	7,411	7,484	9,219	8,041	7,798
Farm gardens	295,379	301,583	284,349	266,082	303,651	295,379	301,583	284,349	266,082	303,651	---	---	---	---	---
Nursery products	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432	20,432
Forest products	306,427	327,011	317,981	309,852	311,091	306,427	327,011	317,981	309,852	311,091	177,597	189,524	184,291	179,578	180,296
Greenhouse products	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839	76,839
Total	10,513,262	9,989,859	9,261,501	10,070,581	9,726,822	6,245,791	6,230,471	5,531,376	5,919,948	5,757,484	5,566,107	5,503,156	4,856,340	5,283,042	5,101,814
ANIMAL PRODUCTS															
Cattle and calves	817,492	878,901	869,504	940,727	1,137,176	921,682	1,002,954	1,010,030	1,005,770	1,124,474	895,397	974,105	982,922	975,233	1,089,124
Hogs	1,186,055	1,598,320	1,753,645	1,570,027	1,387,122	1,323,975	1,666,402	1,757,626	1,506,949	1,477,721	1,088,016	1,340,698	1,413,332	1,208,929	1,208,866
Sheep and lambs	148,803	173,568	174,872	177,508	197,406	133,966	152,612	155,876	150,962	171,463	131,145	149,487	152,848	147,628	168,091
Poultry (chickens)	371,333	410,827	462,333	457,823	444,208	390,991	408,088	445,631	449,314	457,464	229,574	233,710	274,729	261,350	279,864
Eggs	609,638	722,925	735,323	668,218	746,285	583,562	691,897	704,037	639,868	717,103	430,312	519,929	545,934	490,318	560,258
Milk	1,767,366	1,852,191	1,896,855	2,005,097	2,061,464	1,677,561	1,758,841	1,804,605	1,910,545	1,965,358	1,231,776	1,302,654	1,359,099	1,469,154	1,509,962
Wool	87,401	97,245	88,485	86,240	109,299	87,401	97,245	88,485	86,240	109,299	87,401	97,245	88,485	86,240	109,299
Mohair	6,509	5,790	7,219	7,537	10,228	6,509	5,790	7,219	7,537	10,228	6,509	5,790	7,219	7,537	10,228
Bee products	11,597	11,934	11,129	12,490	9,493	11,597	11,934	11,129	12,490	9,493	8,088	8,355	7,678	9,376	6,427
Horses	50,921	44,736	38,056	38,028	36,998	16,163	14,749	16,227	14,973	15,406	16,163	14,749	16,227	14,973	15,406
Mules	26,467	22,787	17,211	16,086	15,205	12,533	10,537	10,194	12,701	12,216	12,533	10,537	10,194	12,701	12,216
Total	5,083,582	5,819,224	6,054,632	5,979,781	6,154,884	5,165,940	5,821,049	6,011,059	5,797,349	6,070,225	4,136,914	4,657,259	4,858,667	4,683,439	4,969,741
Grand total	---	---	---	---	---	11,411,731	12,051,520	11,542,435	11,717,297	11,827,709	9,703,021	10,160,415	9,715,007	9,966,481	10,071,555

Bureau of Agricultural Economics. Estimated quantities produced, sold, and consumed in farm households times weighted annual prices. Cash income plus value of commodities consumed in farm households equals gross income. For feed and seed crops, horses and mules, values include sales by farmers in some States eventually bought by farmers in other States. These inter-farm sales tend to overstate the total income from farm production for the country as a whole.

TABLE 517.—*Wheat: Cost of production, by yield groups, 1928*

Yield group (bushels per acre)	Reports	Average acreage in wheat per farm	Average yield per acre	Gross cost per acre									Credit per acre (straw)	Net cost	
				Prepare and plant	Harvest and thresh	Market	Miscellaneous labor [1]	Fertilizer and manure	Seed	Land rent	Miscellaneous [2]	Total		Per acre	Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Winter-wheat belt: [3]															
12 and under	114	115	9	3.10	3.30	0.68	0.08	0.74	1.39	3.84	1.82	14.95	0.36	14.59	1.62
13 to 18	165	128	16	3.14	4.06	.82	.05	.90	1.36	4.35	2.04	16.72	.32	16.40	1.02
19 to 24	138	103	21	3.41	4.55	.96	.12	.64	1.39	5.04	2.35	18.46	.36	18.10	.86
25 and over	85	117	28	3.37	5.16	1.05	.11	.63	1.41	6.80	2.25	20.78	.38	20.40	.73
Total or average	502	117	18	3.24	4.20	.87	.09	.75	1.39	4.86	2.11	17.51	.35	17.16	.95
Spring-wheat belt: [4]															
12 and under	135	130	9	2.88	2.95	.77	.14	.14	1.55	2.58	1.83	12.84	.17	12.67	1.41
13 to 18	119	147	16	3.22	3.70	.96	.14	.33	1.67	3.48	1.96	15.46	.25	15.21	.95
19 and over	95	129	22	3.48	4.57	1.31	.27	.33	1.71	4.08	2.40	18.15	.38	17.77	.81
Total or average	349	136	15	3.15	3.64	.98	.18	.25	1.63	3.25	2.04	15.12	.26	14.86	.99

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures for 1923, 1924, 1925, 1926, and 1927, see Agriculture Yearbooks, 1924, p. 1133; 1925, p. 1328; 1926, p. 1210; 1927, p. 1136; and 1928, p. 1041.

[1] Includes miscellaneous labor, irrigating and water, seed treatment, and material.
[2] Includes sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.
[3] Winter-wheat belt as used here includes Kansas, Nebraska, Missouri, and Oklahoma.
[4] Spring-wheat belt as used here includes western Minnesota, North Dakota, eastern South Dakota, and eastern Montana.

TABLE 518.—*Corn: Cost of production, by yield groups, 1928*

Yield group (bushels per acre)	Reports	Average acreage in corn per farm	Average yield per acre	Gross cost per acre: Prepare and plant	Cultivate	Harvest	Market	Miscellaneous labor [1]	Fertilizer and manure	Seed	Land rent	Miscellaneous [2]	Total	Credit per acre (stover and fodder)	Net cost: Per acre	Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
All reports:																
7 and under	123	46	4	3.41	2.69	1.19	0.54	0.12	2.25	0.43	3.48	1.89	16.00	1.14	14.86	3.72
8 to 17	631	36	13	3.48	3.06	1.77	1.16	.05	1.89	.36	4.10	1.91	17.78	.93	16.85	1.30
18 to 27	924	36	22	3.96	3.34	2.52	1.68	.06	2.79	.42	4.70	1.89	21.36	1.40	19.96	.91
28 to 37	769	40	32	4.03	3.02	3.32	1.90	.15	2.95	.47	5.62	2.06	23.52	1.69	21.83	.68
38 to 47	672	40	41	4.48	3.07	4.39	2.17	.11	3.56	.52	6.78	2.31	27.39	2.11	25.28	.62
48 to 57	422	44	50	4.88	3.34	5.20	2.54	.19	4.80	.55	7.85	2.61	31.96	2.38	29.58	.59
58 and over	249	33	67	5.47	3.66	6.34	3.11	.14	6.88	.58	8.24	3.03	37.45	3.06	34.39	.51
All groups	3,790	39	31	4.17	3.18	3.42	1.89	.10	3.29	.46	5.70	2.16	24.37	1.72	22.65	.73
Corn Belt: [3]																
17 and under	45	36	12	3.62	2.70	2.07	.99	----------	2.73	.37	3.83	1.85	18.16	1.58	16.58	1.38
18 to 27	115	54	23	3.79	2.72	2.45	1.19	.04	2.09	.39	4.35	1.69	18.71	.98	17.73	.77
28 to 37	218	59	32	3.60	2.50	2.95	1.56	.12	2.15	.41	5.90	1.96	21.15	1.02	20.13	.63
38 to 47	263	63	41	3.85	2.45	3.28	1.75	.04	1.95	.45	7.21	1.88	22.86	.99	21.87	.53
48 to 57	204	68	51	4.22	2.98	4.05	2.10	.07	2.25	.48	8.15	2.28	26.58	1.10	25.48	.50
58 and over	97	54	65	4.29	2.77	4.87	2.39	.05	3.56	.51	8.74	2.69	29.87	1.25	28.62	.44
Total or average	942	59	40	3.92	2.65	3.41	1.76	.07	2.30	.44	6.79	2.04	23.38	1.09	22.29	.56

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures for 1923, 1924, 1925, 1926, and 1927, see Agriculture Yearbooks, 1924, p. 1135; 1925, p. 1332; 1926, p. 1213; 1927, p. 1139; and 1928, p. 1044.

[1] Includes miscellaneous labor, irrigating, and water.
[2] Includes sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.
[3] Corn Belt as used here includes Indiana, Illinois, Iowa, western Ohio, southeast corner of South Dakota, eastern Nebraska, northeast corner of Kansas, and the northern three-fourths of Missouri.

TABLE 519.—*Oats: Cost of production, by yield groups, 1928*

Yield group (bushels per acre)	Reports	Average acreage in oats per farm	Average yield per acre	Gross cost per acre: Prepare and plant	Gross cost per acre: Harvest[1]	Gross cost per acre: Market	Gross cost per acre: Miscellaneous labor[2]	Gross cost per acre: Fertilizer and manure	Gross cost per acre: Seed	Gross cost per acre: Land rent	Gross cost per acre: Miscellaneous[3]	Gross cost per acre: Total	Credit per acre (straw)	Net cost: Per acre	Net cost: Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
17 and under	159	23	11	2.96	2.51	0.60	0.17	0.70	1.45	3.35	1.70	13.44	0.82	12.62	1.15
18 to 22	248	26	20	3.09	3.62	.99	.13	1.31	1.50	4.05	1.94	16.63	1.05	15.58	.78
23 to 27	190	28	25	3.47	3.77	1.06	.11	1.34	1.58	4.27	2.09	17.69	1.58	16.11	.64
28 to 32	445	28	30	3.27	4.12	1.18	.16	1.13	1.51	4.65	2.15	18.17	1.56	16.61	.55
33 to 37	283	27	35	3.43	4.31	1.26	.12	1.40	1.59	5.12	2.36	19.59	1.80	17.79	.51
38 to 42	531	27	40	3.56	4.67	1.41	.16	1.44	1.60	5.81	2.46	21.11	1.65	19.46	.49
43 to 47	168	29	45	3.61	5.01	1.53	.32	1.20	1.60	6.30	2.80	22.37	2.23	20.14	.45
48 to 52	312	28	50	3.59	5.27	1.72	.20	1.55	1.58	6.23	2.66	22.80	2.19	20.61	.41
53 to 57	78	29	55	3.46	5.26	1.53	.16	1.31	1.57	6.87	2.86	23.02	2.41	20.61	.37
58 to 62	123	21	60	3.98	5.97	1.88	.38	1.83	1.78	7.38	2.83	26.03	3.07	22.96	.38
63 and over	84	28	71	3.66	6.22	2.27	.37	1.85	1.68	9.20	3.34	28.59	3.34	25.25	.36

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures for 1923, 1924, 1925, 1926, and 1927, see Agriculture Yearbooks, 1924, p. 1137; 1925, p. 1335; 1926, p. 1217; 1927, p. 1143; and 1928, p. 1048.

[1] Threshing is included under harvesting.
[2] Includes miscellaneous labor, irrigating and water, seed treatment, and material.
[3] Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

TABLE 520.—*Cotton: Cost of production, by yield groups, 1928*

Yield group (pounds of lint per acre)	Reports	Average acreage in cotton per farm	Average yield of lint per acre	Gross cost per acre										Credit per acre (cottonseed)	Net cost of lint	
				Prepare and plant	Cultivate	Harvest and market	Miscellaneous labor [1]	Fertilizer and manure	Seed	Ginning	Land rent	Miscellaneous [2]	Total		Per acre	Per pound
	Number	*Acres*	*Pounds*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
60 and under	25	31	43	4.25	5.18	2.87	0.19	3.84	1.56	0.56	3.50	2.19	24.14	1.75	22.39	0.52
61 to 100	111	62	88	3.66	5.37	3.91	.32	3.74	1.08	.96	3.96	2.10	25.10	2.98	22.12	.25
101 to 140	125	44	125	3.86	5.37	5.54	.18	4.67	1.28	1.39	4.18	2.37	28.84	4.11	24.73	.20
141 to 180	186	55	162	4.11	5.52	6.53	.33	4.72	1.21	1.82	4.73	2.51	31.48	5.33	26.15	.16
181 to 220	154	58	200	4.25	6.49	8.05	.46	4.95	1.31	2.26	5.56	2.62	35.95	6.25	29.70	.15
221 to 260	208	56	246	4.31	6.32	9.32	.49	5.91	1.27	2.63	6.49	2.59	39.33	8.06	31.27	.13
261 to 300	122	67	291	4.97	7.44	10.60	.50	6.61	1.33	3.11	6.67	3.02	44.25	9.02	35.23	.12
301 to 340	35	23	328	4.72	6.22	10.06	.74	6.38	1.08	3.46	7.44	2.31	42.41	9.56	32.85	.10
341 to 380	45	44	360	4.73	6.72	12.50	.30	7.46	1.18	3.92	6.84	2.55	46.20	10.23	35.97	.10
381 to 420	45	26	402	5.01	6.18	12.08	.37	8.37	1.44	4.20	7.81	3.50	48.96	11.47	37.49	.09
421 to 460	20	18	447	5.78	8.78	13.26	.71	7.16	1.50	4.47	7.25	3.01	51.92	13.04	38.88	.09
461 to 500	30	27	497	5.81	7.45	15.26	.91	9.75	1.65	4.89	8.30	3.70	57.72	14.81	42.91	.09
501 and over	13	12	647	4.46	6.60	19.44	1.86	8.08	1.23	6.72	10.96	3.17	62.52	16.57	45.95	.07

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] Includes miscellaneous labor, irrigating and water, dusting, and dusting material.
[2] Includes picking sacks and sheets, crop insurance, use of implements, use of storage buildings, and overhead.

TABLE 521.—*Cotton: Cost of production, by yield groups, 1924–1928*

Yield group (pounds of lint per acre) [1]	Farms reporting					Average yield of lint per acre					Net cost of lint per pound [2]				
	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928	1924	1925	1926	1927	1928
	Number	*Number*	*Number*	*Number*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
60 and under	24	47	32	45	25	36	34	41	37	43	51	71	47	59	52
61 to 100	107	79	91	72	111	93	89	89	87	88	27	31	25	26	25
101 to 140	186	112	114	90	125	125	126	126	126	125	20	21	20	20	20
141 to 180	284	207	166	135	186	161	162	164	164	162	18	18	16	15	16
181 to 220	221	187	130	117	154	200	202	200	202	200	16	16	15	14	15
221 to 260	288	277	200	197	208	246	246	246	245	246	13	13	13	13	13
261 to 300	156	158	106	102	122	293	292	292	291	291	13	12	12	12	12
301 to 340	39	54	48	32	35	324	325	326	325	328	11	12	12	10	10
341 to 380	46	70	46	54	45	361	360	360	361	360	11	12	10	10	10
381 to 420	60	79	56	52	45	400	400	400	401	402	10	10	12	11	9
421 to 460	21	39	19	26	20	448	446	447	443	447	10	11	10	9	9
461 to 500	33	65	41	47	30	493	496	493	496	497	8	9	9	9	9
501 and over	6	31	21	23	13	637	600	582	609	647	7	8	9	8	7

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] The average yield of lint cotton in the United States has been as follows: 1924, 157.4 pounds; 1925, 167.2 pounds; 1926, 182.6 pounds; 1927, 154.5 pounds, 1928, 152.9 pounds.

[2] The average cost per pound for the yield groups which closely approximated the average yields for the United States are as follows: 1924, 18 cents; 1925, 18 cents; 1926, 15.5 cents; 1927, 17 cents; 1928, 17 cents. At least a part of the yearly variations in costs in some of the upper and lower yield groups may be due to the small number of reports, and to the relative number of reports received each year from various sections of the Cotton Belt.

TABLE 522.—*Cost of producing wheat, corn, and oats, 1928*

Averages by geographical divisions [1]

Crop and geographical division	Reports	Acreage per crop per farm	Yield per acre	Gross cost per acre: Prepare and plant	Gross cost per acre: Cultivate	Gross cost per acre: Harvest [2]	Gross cost per acre: Market	Gross cost per acre: Miscellaneous labor [3]	Gross cost per acre: Fertilizer and manure	Gross cost per acre: Seed	Gross cost per acre: Land rent	Gross cost per acre: Miscellaneous [4]	Gross cost per acre: Total	Credit per acre for by-products	Net cost: Per acre	Net cost: Per bushel
	Number	*Acres*	*Bushels*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
WHEAT																
North Atlantic	196	14	18	6.26	----------	5.39	1.30	0.12	6.53	3.01	6.30	3.16	32.07	4.95	27.12	1.51
South Atlantic	252	19	17	4.46	----------	4.84	1.36	.18	4.98	2.29	6.04	2.64	26.79	2.59	24.20	1.42
East North Central	535	23	14	4.13	----------	3.71	.86	.11	3.57	2.41	5.99	2.52	23.30	1.73	21.57	1.54
West North Central	851	102	17	3.17	----------	4.03	.93	.14	.63	1.60	4.52	2.13	17.15	.40	16.75	.99
South Central	242	81	12	3.27	----------	3.46	.85	.09	1.55	1.66	5.62	2.13	18.63	.73	17.90	1.49
Western	324	135	24	4.27	----------	4.73	1.48	1.25	.46	1.54	9.09	2.68	25.50	.60	24.90	1.04
United States	2,400	72	17	3.93	----------	4.19	1.05	.27	2.29	1.97	6.25	2.42	22.37	1.36	21.01	1.24
CORN																
North Atlantic	206	10	44	7.37	4.22	7.92	2.69	.10	11.22	.76	6.64	3.37	44.29	5.41	38.88	.88
South Atlantic	481	22	30	4.96	3.96	4.07	2.11	.11	5.32	.44	5.81	2.44	29.22	3.00	26.22	.87
East North Central	811	36	41	4.64	3.05	4.62	2.02	.08	4.25	.53	6.41	2.47	28.07	2.32	25.75	.63
West North Central	1,045	65	33	3.25	2.38	2.98	1.59	.05	1.54	.44	5.19	1.77	19.19	.84	18.35	.56
South Central	1,145	28	22	3.82	3.57	1.93	1.86	.06	2.12	.39	5.49	1.97	21.21	.92	20.29	.92
Western	102	41	23	3.46	2.10	2.53	2.04	1.38	1.14	.43	5.05	2.01	20.14	1.39	18.75	.82
United States	3,790	39	31	4.17	3.18	3.42	1.89	.10	3.29	.46	5.70	2.16	24.37	1.72	22.65	.73
OATS																
North Atlantic	284	12	38	6.25	----------	6.04	1.73	.13	3.79	2.33	5.74	3.24	29.25	4.10	25.15	.66
South Atlantic	201	11	29	4.14	----------	4.42	1.37	.17	3.13	1.92	5.12	2.39	22.66	2.23	20.43	.70
East North Central	732	25	42	3.30	----------	4.48	1.35	.15	1.43	1.52	6.16	2.57	20.96	2.43	18.53	.44
West North Central	998	37	36	2.61	----------	4.06	1.21	.11	.44	1.39	4.83	2.12	16.77	.79	15.98	.44
South Central	246	21	28	2.88	----------	4.11	1.29	.11	.91	1.48	4.99	1.95	17.72	1.17	16.55	.59
Western	160	26	40	4.17	----------	5.02	1.75	.94	.64	1.35	6.66	2.45	22.98	1.30	21.68	.54
United States	2,621	27	37	3.44	----------	4.49	1.35	.18	1.34	1.57	5.44	2.38	20.19	1.79	18.40	.50

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters. For figures for 1923, 1924, 1925, 1926, and 1927, see June issues of Monthly Supplement, Crops and Markets, 1924, p. 176; 1925, p. 180; 1926, p. 170; Crops and Markets, June issues, 1927; p. 202; 1928, p. 196.

[1] The States included in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois, Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

[2] Threshing for wheat and oats is included under harvesting.

[3] Includes miscellaneous labor, irrigating and water, and seed treatment and material.

[4] Sacks and twine, crop insurance, use of implements, use of storage buildings, and overhead.

TABLE 523.—*Cost of producing wheat, corn, and oats, 1923–1928*

Crop and geographical division [1]	Number of reports						Net cost per acre (dollars)						Net cost per bushel (cents)						Yield per acre (bushels)					
	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928	1923	1924	1925	1926	1927	1928
WHEAT																								
North Atlantic	642	427	310	258	279	196	28.43	28.46	30.43	29.41	28.48	27.12	124	142	132	128	129	151	23	20	23	23	22	18
South Atlantic	961	478	400	277	263	252	22.42	23.92	25.49	24.24	22.58	24.20	160	160	150	121	151	142	14	15	17	20	15	17
East North Central	2,028	1,183	1,084	969	762	535	22.12	23.05	23.29	23.37	22.58	21.57	111	115	129	102	113	154	20	20	18	23	20	14
West North Central	2,479	1,524	1,326	1,335	1,168	851	16.17	17.38	17.16	16.31	16.95	16.75	124	97	123	116	113	99	13	18	14	14	15	17
South Central	745	408	241	260	227	242	17.16	17.74	17.89	18.61	17.80	17.90	132	118	149	98	148	149	13	15	12	19	12	12
Western	997	596	398	446	420	324	23.95	24.05	26.20	23.93	24.43	24.90	109	120	119	120	106	104	22	20	22	20	23	24
United States	7,852	4,616	3,759	3,545	3,119	2,400	21.02	21.88	22.41	21.33	21.30	21.01	124	122	132	112	118	124	17	18	17	19	18	17
CORN																								
North Atlantic	815	585	432	317	319	206	40.73	41.99	44.23	42.70	38.91	38.88	87	102	87	91	85	88	47	41	51	47	46	44
South Atlantic	1,655	881	772	472	503	481	25.57	27.07	27.71	26.13	25.62	26.22	85	97	96	84	83	87	30	28	29	31	31	30
East North Central	2,714	1,690	1,664	1,394	1,110	811	26.77	25.60	27.35	26.06	26.00	25.75	61	75	56	61	68	63	44	34	49	43	38	41
West North Central	3,312	2,242	1,988	1,837	1,741	1,045	18.81	18.96	19.98	18.28	19.24	18.35	54	70	59	68	57	56	35	27	34	27	34	33
South Central	2,285	1,456	1,176	895	945	1,145	21.18	21.13	21.87	20.72	20.99	20.29	88	88	99	74	81	92	24	24	22	28	26	22
Western	457	299	150	205	160	102	19.02	18.58	20.77	19.59	21.80	18.75	66	88	83	93	84	82	29	21	25	21	26	23
United States	11,238	7,153	6,182	5,120	4,778	3,790	23.75	23.77	24.97	23.10	23.21	22.65	68	82	69	70	70	73	35	29	36	33	33	31
OATS																								
North Atlantic	877	647	473	381	411	284	24.89	25.76	26.09	26.07	25.03	25.15	67	63	61	64	63	66	37	41	43	41	40	38
South Atlantic	834	421	351	230	239	201	19.14	20.12	21.28	20.31	20.27	20.43	74	75	76	70	72	70	26	27	28	29	28	29
East North Central	2,227	1,480	1,477	1,242	973	732	18.21	18.84	19.07	18.34	18.77	18.53	48	44	45	46	51	44	38	43	42	40	37	42
West North Central	2,974	2,029	1,798	1,587	1,464	998	15.31	16.43	16.38	15.01	15.91	15.98	45	44	46	56	50	44	34	37	36	27	32	36
South Central	865	510	347	361	259	246	15.84	16.23	16.90	17.71	15.98	16.55	63	58	77	47	67	59	25	28	22	38	24	28
Western	704	422	229	244	244	160	22.74	22.62	24.64	21.56	22.52	21.68	55	65	65	65	55	54	41	35	38	33	41	40
United States	8,481	5,509	4,675	4,045	3,590	2,621	18.08	18.93	19.01	17.99	18.47	18.40	52	50	51	53	54	50	35	38	37	34	34	37

Bureau of Agricultural Economics. From returns to mail inquiry sent to crop reporters.

[1] The States included in the geographical divisions are as follows: North Atlantic—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania. South Atlantic—Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida. East North Central—Ohio, Indiana, Illinois, Michigan, and Wisconsin. West North Central—Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas. South Central—Kentucky, Tennessee, Alabama, Mississippi, Louisiana, Texas, Oklahoma, and Arkansas. Western—Montana, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Idaho, Washington, Oregon, and California.

TABLE 524.—*Indexes of the volume of net agricultural production* [1]

[1919–1927=100]

Year	Grains	Fruits and vegetables	Truck crops	Meat animals	Dairy products	Poultry products	Cotton and cottonseed	Total
1919	101	82	71	96	81	85	91	91
1920	116	102	86	92	80	84	105	97
1921	100	76	74	91	91	95	64	87
1922	100	109	101	97	95	98	77	96
1923	97	108	99	107	103	107	80	101
1924	100	106	111	108	109	100	108	106
1925	95	98	115	102	110	104	128	106
1926	93	116	114	103	114	111	143	111
1927	97	104	129	103	116	116	103	106
1928	106	122	124	105	117	112	114	111
1929	92	98	139	105	117	107	119	107

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[1] These indexes are based on estimates of production for sale and for consumption in the farm home. Production fed to livestock or used for seed is not included. For example, instead of total production, only the amounts of corn and oats shipped out of county where grown and only a small percentage of the hay crops are included. The index of dairy products represent total milk production for all purposes. Production of meat animals is represented by total slaughter, including slaughter for farm use. Calendar-year production of livestock and livestock products are here compared with crop production of the same year. Each group index as well as the total is obtained by multiplying the yearly quantities by a 1919–1927 average farm price received by producers for each of the commodities, and the sum of these yearly values at average prices, divided by the corresponding average sum for the period 1919 1927, taken as 100. The following commodities included in the index contribute about 90 per cent of the gross income from agricultural production: Grains—wheat, corn, oats, barley, rye, buckwheat, kafir, rice; fruits and vegetables—grapes, apples, apricots, peaches, pears, cranberries, figs, grapefruit, lemons, olives, oranges, potatoes, sweetpotatoes, dry edible beans; truck crops—asparagus, snap beans, cabbage, cantaloupes, cauliflower, celery, cucumbers, lettuce, onions, peas, spinach, strawberries, tomatoes, watermelons; meat animals—cattle, calves, sheep, lambs, hogs; dairy products—milk, total production; poultry products—chickens and eggs; cotton and cottonseed; total includes also tobacco, wool, and hay.

TABLE 525.—*Current value of capital rates earned on agricultural and nonagricultural capital, and income per farm available for capital, labor, and management, 1919–1928*

Year beginning July	Current value of all capital used in agricultural production [1]	Current value of operator's net investment in agricultural production [2]	Rates earned for capital and management on—		Income per farm available for—	
			Total capital	Operator's net capital	Capital, labor, and management [3]	Labor and management [4]
	1,000,000 dollars	*1,000,000 dollars*	*Per cent*	*Per cent*	*Dollars*	*Dollars*
1919	79, 325	46, 941	6. 3	5. 7	1, 246	918
1920	73, 043	41, 076	. 5	−4. 2	684	397
1921	63, 734	34, 634	1. 2	−2. 3	514	271
1922	62, 489	34, 261	3. 2	1. 2	682	441
1923	60, 391	32, 968	3. 5	1. 6	766	534
1924	59, 683	32, 514	4. 5	3. 2	854	624
1925	59, 650	32, 665	5. 2	4. 4	922	691
1926	58, 254	31, 811	4. 3	2. 9	862	636
1927	58, 346	32, 106	4. 7	3. 6	896	668
1928	58, 645	32, 533	4. 7	3. 7	901	669

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[1] As of Jan. 1 in the period indicated. Values include land, buildings (dwellings and other), livestock, implements, machinery, motor vehicles, and an allowance for cash working capital.
[2] Total capital investment less property rented from nonoperators and debts owed to nonoperators.
[3] Net income available for operators' capital, labor, and management calculated on the basis of the number of farmers interpolated between 6,448,000 in 1920 and 6,372,000 in 1925.
[4] After allowing 4½ per cent on operators' net capital investment.

TABLE 526.—*Gross value of farm production and gross income, 1919–1928*

Year beginning July	Gross value of all farm production [1]	Deductions for products fed, used for seed, and waste [2]	Gross income from farm production						
			Total	Grains	Meat animals	Fruits and vegetables	Cotton and cottonseed	Dairy and poultry products	All other
	1,000,000 dollars	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000 000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*
1919	24,025	8,306	15,719	3,005	3,346	1,747	2,271	3,598	1,752
1920	17,800	5,132	12,668	2,246	2,328	1,705	1,272	3,502	1,615
1921	12,894	3,680	9,214	1,266	1,932	1,379	760	2,877	1,000
1922	14,909	4,543	10,366	1,393	2,180	1,410	1,251	2,957	1,175
1923	16,249	4,961	11,288	1,393	2,167	1,526	1,608	3,315	1,279
1924	17,086	5,083	12,003	1,842	2,619	1,333	1,719	3,258	1,232
1925	16,995	4,325	12,670	1,594	2,848	1,686	1,749	3,589	1,204
1926	16,487	4,360	12,127	1,455	2,883	1,585	1,260	3,775	1,169
1927	17,153	4,849	12,304	1,605	2,871	1,500	1,476	3,630	1,222
1928	17,144	4,617	12,527	1,540	3,016	1,436	1,479	3,840	1,216

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[1] These gross values of all farm production are here evaluated in terms of crop year (practically July-June) production and weighted average farm prices.
[2] These deductions, to obtain gross income, cover portions of crops and dairy products fed to livestock, used for seed in further crop production, and waste. For the industry as a whole these deductions constitute raw materials, the income from which is derived from the finished products sold or consumed in the farm home.

TABLE 527.—*Distribution of gross income from agricultural production, 1919–1928*

Year beginning July	Gross income	Value of food and fuel consumed on farms	Cash income from sales	Distribution of cash income					
				Wages to hired labor [1]	Operating costs	Taxes on operator-owned investment	Rent on property rented from nonoperators	Interest on debts to nonoperators	Balance available for living expenses, etc.
	1,000,000 dollars	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*	*1,000,000 dollars*
1919	15,719	2,887	12,832	1,492	3,306	388	1,712	787	5,147
1920	12,668	2,645	10,023	1,732	3,689	545	1,399	897	1,761
1921	9,214	2,129	7,085	1,088	2,448	582	959	840	1,168
1922	10,366	2,168	8,198	1,061	2,501	617	1,014	809	2,196
1923	11,288	2,360	8,928	1,204	2,760	626	1,034	774	2,530
1924	12,003	2,327	9,676	1,207	2,865	635	1,094	758	3,117
1925	12,670	2,535	10,135	1,216	3,053	635	1,127	758	3,346
1926	12,127	2,590	9,584	1,238	2,980	645	1,042	750	2,882
1927	12,304	2,434	9,920	1,231	2,954	657	1,043	750	3,235
1928	12,527	2,578	10,001	1,226	3,144	664	1,048	760	3,107

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[1] Includes value of board as well as cash.

TABLE 528.—*Index numbers of farm prices, United States, 1910–1929*

[August, 1909–July, 1914=100]

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
GRAINS													
1910	110	112	112	109	107	106	107	106	102	97	92	90	104
1911	91	90	88	89	92	94	97	99	101	104	103	102	96
1912	104	107	110	116	123	122	115	106	100	95	87	82	106
1913	84	86	86	88	91	94	93	95	98	97	96	97	92
1914	97	98	99	100	101	100	97	104	111	110	108	111	103
1915	123	134	136	138	139	127	118	115	106	101	99	102	120
1916	112	115	111	111	113	110	113	127	138	147	158	157	126
1917	161	169	179	217	251	246	250	248	233	223	213	213	217
1918	218	227	234	235	231	227	228	230	229	222	216	217	226
1919	217	214	220	234	245	245	248	246	233	222	220	229	231
1920	241	242	246	261	277	283	266	252	222	193	157	138	231
1921	138	136	131	118	116	117	109	103	100	94	88	88	112
1922	91	102	111	114	115	111	105	100	97	101	106	111	105
1923	113	114	117	121	123	119	112	109	111	113	110	108	114
1924	110	113	114	113	114	116	130	141	140	150	147	155	129
1925	172	178	172	152	159	164	152	157	148	135	138	140	156
1926 [1]	143	140	133	131	131	130	125	128	121	123	121	120	129
1927 [1]	120	122	121	119	127	140	139	138	134	128	120	123	128
1928 [1]	125	128	136	144	160	152	142	120	117	116	110	112	130
1929 [1]	115	123	124	120	113	111	122	129	131	128	118	119	121
FRUITS AND VEGETABLES													
1910	90	93	92	92	96	93	90	94	94	88	84	87	91
1911	92	94	97	106	108	121	129	125	109	94	93	102	106
1912	109	118	130	144	150	135	116	104	86	74	73	78	110
1913	79	81	81	83	92	99	103	102	96	97	96	97	92
1914	101	106	110	115	117	119	113	102	92	79	71	72	100
1915	75	78	77	82	90	91	89	85	76	79	84	89	83
1916	99	108	112	114	117	124	125	123	121	129	147	156	123
1917	167	208	241	265	283	270	219	165	146	150	155	156	202
1918	158	162	157	156	160	160	172	177	166	160	158	155	162
1919	154	156	167	179	197	205	216	219	194	186	187	206	189
1920	226	252	279	323	373	366	314	239	180	150	141	144	249
1921	136	127	125	124	132	140	156	178	171	162	162	165	148
1922	159	173	181	190	206	197	174	129	109	101	101	104	152
1923	117	122	130	146	157	161	165	151	131	123	114	114	136
1924	118	123	123	128	132	146	142	138	113	109	108	110	124
1925	122	131	138	146	162	184	178	178	142	152	194	194	160
1926 [2]	214	218	220	253	240	216	195	166	136	136	142	137	189
1927 [2]	140	142	140	147	158	201	195	172	145	138	136	141	155
1928 [2]	144	153	174	179	181	168	156	137	127	114	109	108	146
1929 [2]	109	111	112	110	119	120	136	160	160	168	159	163	136
MEAT ANIMALS													
1910	99	100	109	115	110	109	103	98	102	101	96	93	103
1911	96	93	92	88	84	82	83	88	88	84	83	82	87
1912	83	85	87	96	98	96	95	100	103	104	99	99	95
1913	99	103	109	113	100	110	111	110	109	110	108	107	108
1914	109	112	114	114	113	112	114	118	117	111	106	104	112
1915	103	101	101	103	106	107	106	105	106	108	101	98	104
1916	101	108	116	121	123	124	124	123	127	122	123	125	120
1917	131	144	162	177	179	177	173	178	190	194	186	190	173
1918	187	188	194	204	210	207	205	211	214	204	198	199	202
1919	201	204	211	224	227	221	228	227	197	185	177	173	206
1920	181	184	184	186	181	182	181	177	177	169	150	124	173
1921	123	119	125	114	111	105	109	112	101	98	92	91	108
1922	95	108	118	117	119	121	120	114	112	113	108	107	113
1923	110	110	110	110	108	103	105	104	112	106	100	98	106
1924	101	102	104	106	107	105	103	116	115	121	115	113	109
1925	123	126	145	146	139	139	148	149	143	141	136	136	139
1926	140	146	147	146	148	154	152	144	148	148	142	140	146
1927	140	143	144	143	137	129	131	136	142	145	141	138	139
1928	138	139	139	142	151	150	157	162	174	160	150	143	150
1929	146	150	160	164	164	163	167	165	156	151	144	143	156

[1] Kafir omitted.
[2] Onions and cabbage omitted.

TABLE 528.—*Index numbers of farm prices, United States, 1910–1929*—Continued

DAIRY PRODUCTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	106	103	98	101	97	96	95	97	100	102	103	105	100
1911	104	99	96	94	92	90	92	95	97	97	101	104	97
1912	107	108	106	103	102	99	99	100	102	105	103	103	103
1913	102	100	100	99	98	96	96	102	106	100	104	104	100
1914	105	102	100	98	96	95	96	99	101	101	103	102	100
1915	102	101	98	97	97	94	93	95	96	98	100	102	98
1916	102	99	100	99	99	97	96	100	101	106	112	116	102
1917	115	117	116	119	123	120	119	123	129	138	142	146	125
1918	149	150	148	144	142	142	141	146	152	163	169	172	152
1919	173	165	164	166	166	166	167	170	175	181	190	197	173
1920	196	194	189	192	187	182	181	185	186	190	189	182	188
1921	172	165	160	154	141	132	133	138	140	146	148	147	148
1922	140	134	133	131	126	128	127	129	133	136	140	147	134
1923	151	151	148	147	142	142	139	142	145	153	157	155	148
1924	152	150	146	134	128	126	123	120	126	130	132	137	134
1925	134	134	137	132	132	130	131	135	137	146	146	146	137
1926	147	143	141	133	130	128	129	128	133	134	141	144	136
1927	144	143	139	140	136	132	130	129	135	139	141	145	138
1928	145	145	142	139	136	134	134	135	141	143	144	146	140
1929	145	144	144	142	139	135	135	137	139	141	142	140	140

POULTRY PRODUCTS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	130	116	98	91	90	89	88	90	98	109	120	129	104
1911	116	90	77	74	74	73	75	81	89	100	115	125	91
1912	127	118	97	84	82	81	83	88	97	109	123	124	101
1913	111	98	87	81	82	84	85	90	101	116	133	138	101
1914	130	119	99	86	85	87	89	95	105	112	123	133	105
1915	133	114	91	84	84	84	84	88	97	111	126	134	103
1916	127	110	95	90	93	96	99	106	120	137	156	166	116
1917	162	156	139	134	145	141	138	147	162	174	185	198	157
1918	210	201	168	150	148	149	160	172	185	205	229	247	185
1919	234	190	165	175	185	185	186	195	203	225	255	275	206
1920	267	236	205	189	186	185	191	204	222	243	267	272	222
1921	243	185	131	114	111	114	128	143	156	180	210	211	161
1922	176	140	118	110	114	113	111	114	132	159	187	198	139
1923	175	151	130	117	117	114	116	126	144	165	191	198	145
1924	162	157	109	105	109	115	121	132	153	176	203	217	147
1925	213	166	124	127	131	135	141	148	152	175	208	213	161
1926	172	145	128	133	135	138	137	137	155	173	202	212	156
1927	173	145	115	114	112	102	112	122	143	167	189	195	141
1928	177	144	122	121	128	127	134	140	156	168	185	197	150
1929	161	158	144	127	134	140	143	151	165	181	200	204	159

COTTON AND COTTONSEED

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	116	113	113	113	114	113	113	115	112	111	113	115	113
1911	117	114	113	114	116	116	110	100	88	77	72	70	101
1912	71	76	81	85	89	89	93	92	89	88	91	97	87
1913	97	96	95	95	94	94	94	93	101	106	102	98	97
1914	96	99	99	98	100	101	100	86	66	58	54	57	85
1915	60	65	67	73	74	72	70	70	81	99	99	100	78
1916	100	100	99	102	104	107	109	115	128	144	163	160	119
1917	148	144	149	160	169	189	204	199	197	214	232	237	187
1918	244	249	257	251	235	234	235	246	264	253	236	235	245
1919	225	208	206	213	232	249	260	259	252	277	295	292	247
1920	293	295	298	304	303	301	297	266	218	175	132	101	248
1921	93	89	80	76	78	78	79	91	130	150	137	131	101
1922	129	128	131	135	144	160	166	166	160	168	186	195	156
1923	203	215	224	222	211	207	199	190	204	221	238	253	216
1924	255	247	219	226	222	219	215	219	175	182	179	176	211
1925	182	183	195	189	184	183	186	186	178	171	144	139	177
1926	138	142	133	135	130	132	126	130	134	94	88	81	122
1927	85	94	102	101	113	119	125	136	179	169	162	153	128
1928	152	141	147	154	166	162	170	153	142	147	146	148	152
1929	148	149	155	152	148	146	145	146	146	141	132	130	145

TABLE 528.—*Index numbers of farm prices, United States, 1910–1929*—Continued

ALL GROUPS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1910	106	105	107	108	105	104	102	102	102	101	99	99	103
1911	100	97	95	94	94	95	95	96	95	92	92	92	95
1912	94	97	99	104	107	104	101	100	98	97	95	95	99
1913	95	96	97	98	98	99	99	101	103	104	104	103	100
1914	104	105	104	104	104	104	103	104	102	98	96	97	102
1915	100	101	100	102	104	101	99	97	97	101	99	100	100
1916	104	106	108	110	111	112	113	117	123	128	137	139	117
1917	140	148	159	176	188	188	185	183	184	187	187	191	176
1918	194	197	199	200	198	196	197	203	207	204	200	201	200
1919	200	194	197	207	215	216	222	222	208	206	209	212	209
1920	219	221	222	230	235	234	224	209	194	178	158	140	205
1921	135	128	123	115	112	110	111	116	118	120	116	115	116
1922	114	118	123	123	127	128	126	120	119	123	126	131	124
1923	134	136	136	137	135	133	130	128	132	134	136	137	135
1924	137	136	131	130	129	130	132	139	132	138	137	139	134
1925	146	146	151	147	146	148	149	152	144	143	144	143	147
1926 [3]	143	143	140	140	139	139	136	133	134	130	130	127	136
1927 [3]	126	127	126	125	126	130	130	132	140	139	137	137	131
1928 [3]	137	135	137	140	148	145	145	139	141	137	134	134	139
1929 [3]	133	136	140	138	136	135	140	143	141	140	136	135	138

Bureau of Agricultural Economics. Prices of farm production received by producers collected monthly from a list of about 12,000 special price reporters. This list is made up almost entirely of country-town dealers, elevator managers, buyers, and merchants.

The commodities by groups are as follows: Grains—wheat, corn, oats, barley, rye, kafir; fruits and vegetables—apples, oranges, grapefruit, potatoes, sweetpotatoes, beans, onions, cabbage; meat animals—beef cattle, calves, hogs, sheep, lambs; dairy products—butter (represents butter, butterfat, and cream), milk; poultry products—chickens, eggs; cotton and cottonseed; all groups includes also horses (represents horses and mules), hay, flax, tobacco, and wool.

[3] Kafir, onions, and cabbage omitted.

TABLE 529.—*Index numbers of farm prices, 1910–1928: By groups, crop-year averages*

[August, 1909–July, 1914=100]

Year beginning July	Grains	Fruits and vegetables	Meat animals	Dairy products	Poultry products	Cotton and cottonseed	All groups
1910	95	96	94	98	95	114	98
1911	107	120	88	101	98	84	97
1912	93	87	104	101	97	93	97
1913	98	105	111	101	106	99	103
1914	120	85	108	99	104	69	101
1915	109	98	110	98	104	94	104
1916	172	186	143	112	138	148	146
1917	229	162	192	139	169	229	192
1918	226	170	210	162	364	234	203
1919	240	252	190	185	217	286	220
1920	164	163	140	170	191	140	152
1921	102	175	107	137	150	129	119
1922	111	129	110	141	142	194	130
1923	112	131	104	144	141	224	132
1924	155	134	125	131	158	188	142
1925	140	200	144	139	157	151	143
1926	124	153	142	137	148	106	129
1927	136	160	141	138	146	154	138
1928	119	119	158	141	154	150	137

Bureau of Agricultural Economics.

See footnotes, Table 527.

GENERAL NOTE.—Tables similar to Tables 495–501, 1927 Yearbook, index numbers of wholesale prices, are omitted.

TABLE 530.—*Index numbers of general trend of prices and wages*

[1910–1914=100]

Year and month	Wholesale prices of all commodities [1]	Industrial wages [2]	Prices paid by farmers for commodities used in—			Farm wages	Taxes [3]
			Living	Production	Living production		
1910	103	--------	98	98	98	97	--------
1911	95	--------	100	103	101	97	--------
1912	101	--------	101	98	100	101	--------
1913	102	--------	100	102	100	104	--------
1914	100	--------	102	99	101	101	100
1915	103	101	107	103	106	102	102
1916	129	114	125	121	123	112	104
1917	180	129	148	152	150	140	106
1918	198	160	180	176	178	176	118
1919	210	185	214	192	205	206	130
1920	230	222	227	175	206	239	155
1921	150	203	165	142	156	150	217
1922	152	197	160	140	152	146	232
1923	156	214	161	142	153	166	246
1924	152	218	162	143	154	166	249
1925	162	223	165	149	159	168	250
1926	154	229	164	144	156	171	253
1927	149	231	161	144	154	170	258
1928	153	232	162	146	156	169	263
1929	151	236	--------	--------	--------	170	--------
1929							
January	152	234	--------	--------	--------	162	--------
February	151	236	--------	--------	--------	--------	--------
March	153	239	161	148	156	--------	--------
April	152	237	--------	--------	--------	167	--------
May	150	236	--------	--------	--------	--------	--------
June	151	236	160	146	155	--------	--------
July	154	235	--------	--------	--------	173	--------
August	153	237	--------	--------	--------	--------	--------
September	153	240	161	146	155	--------	--------
October	151	237	--------	--------	--------	174	--------
November	148	233	--------	--------	--------	--------	--------
December	148	234	--------	--------	--------	--------	--------

Bureau of Agricultural Economics.

[1] Bureau of Labor Statistics. Index for 1929 obtained by multiplying new series by 156.6.
[2] Average weekly earnings, New York State factories. June, 1914=100.
[3] Index of estimate of total taxes paid on all farm property. 1914=100.

TABLE 531.—*Index numbers of prices paid by farmers, 1910–1929*

[Base 1910–1914=100]

Year or date	Commodities used in production							Wages paid to hired labor	Commodities bought for use in production plus wages paid to hired labor	Commodities bought for family maintenance [2]	Taxes on farm property [3]
	Feed	Machinery	Fertilizer	Building materials for other than house	Equipment and supplies	Seed [1]	All commodities bought for use in production				
1910	92	101	97	100	101	-------	98	97	98	98	------
1911	108	103	97	102	100	-------	103	97	101	100	------
1912	90	100	102	103	100	105	98	101	99	101	------
1913	108	98	104	101	100	94	102	104	102	99	------
1914	103	98	101	93	99	101	99	101	100	102	100
1915	98	101	113	102	106	117	103	102	103	107	102
1916	129	111	122	118	129	112	121	112	119	125	104
1917	186	132	139	137	156	141	152	140	149	148	106
1918	196	160	173	161	180	188	176	176	176	180	118
1919	208	178	185	189	179	264	192	206	196	214	130
1920	133	188	189	205	188	149	175	239	189	227	155
1921	91	175	159	156	151	125	142	150	144	165	217
1922	118	156	131	159	139	133	140	146	142	160	232
1923	128	151	128	160	138	142	142	166	147	161	246
1924	135	155	122	159	131	148	143	166	148	162	249
1925	145	158	131	163	136	170	149	168	154	165	250
1926	120	156	129	163	142	190	144	171	150	164	253
1927	124	157	123	164	134	192	144	170	150	161	258
1928	133	158	133	161	131	179	146	169	151	162	262
1923:											
Jan. 15	121	149	123	158	137	138	138	137	138	158	------
Apr. 15	129	150	127	160	143	143	142	148	144	163	------
July 15	132	153	130	163	141	139	144	169	150	163	------
Oct. 15	131	153	130	161	130	146	142	174	149	162	------
1924:											
Jan. 15	127	154	127	160	130	142	141	159	145	163	------
Apr. 15	128	154	117	160	137	155	142	163	147	162	------
July 15	138	155	119	158	132	148	143	168	149	159	------
Oct. 15	148	155	125	159	125	148	145	171	151	161	------
1925:											
Jan. 15	154	157	127	161	126	163	149	156	150	164	------
Apr. 15	146	158	130	161	138	178	150	163	153	166	------
July 15	147	157	132	165	141	178	152	169	156	166	------
Oct. 15	134	157	134	164	140	159	147	173	153	165	------
1926:											
Jan. 15	126	155	130	162	140	183	145	159	148	165	------
Apr. 15	119	156	128	163	143	191	144	166	149	164	------
June 15	119	156	132	163	146	196	145	174	152	165	------
Sept. 15	122	156	127	162	144	188	145	176	152	163	------
Dec. 15	115	156	128	162	140	192	143	162	147	163	------
1927:											
Mar. 15	117	157	121	164	137	202	143	166	148	161	------
June 15	128	157	121	164	133	202	145	172	151	161	------
Sept. 15	130	157	125	164	133	181	145	175	152	161	------
Dec. 15	123	157	125	161	132	181	142	161	146	161	------
1928:											
Mar. 15	130	156	133	160	132	181	145	166	149	162	------
June 15	143	156	133	161	130	181	148	170	153	163	------
Sept. 15	131	156	132	162	131	177	144	175	151	163	------
Dec. 15	129	162	132	162	131	177	146	162	150	161	------
1929:											
Mar. 15	136	162	134	163	129	201	148	167	153	161	------
June 15	128	162	134	163	129	201	146	173	152	160	------
Sept. 15	133	162	131	162	129	179	146	174	153	161	------
Dec. 15	------	------	------	------	------	------	------	------	------	------	------

Bureau of Agricultural Economics. Compiled from prices reported to the Department of Agriculture by retail dealers throughout the United States. The index numbers include only commodities bought by farmers; the commodities being weighted according to purchases reported by actual farmers in farm management and rural-life studies from 1920 to1925.

[1] 1912–1914=100.
[2] Includes food, clothing, household operating expenses, furniture and furnishings, and building material for house.
[3] 1914=100.

GENERAL NOTE.—Tables similar to Tables 504–507, 1927 Yearbook, pertaining to farm business and farm family living in certain localities, and Table 508.—Average prevailing farm wage rates, by geographic divisions, are omitted.

TABLE 532.—*Coffee, Rio, No. 7: Average wholesale price per pound, New York, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Av. 1921–1925	12.5	13.1	13.2	12.8	12.4	13.1	12.8	13.0	13.5	13.9	14.3	14.2	13.2
1920	16.3	14.8	15.0	15.1	15.6	15.0	13.1	9.4	8.2	7.6	7.5	6.6	12.0
1921	6.7	6.7	6.4	6.0	6.2	6.7	6.5	7.0	7.9	8.1	8.8	9.3	7.2
1922	9.6	9.0	9.6	10.8	11.0	11.0	10.4	10.0	10.2	10.2	10.8	11.1	10.3
1923	11.9	13.0	13.0	11.5	11.6	11.7	10.9	10.7	10.7	11.1	11.0	10.9	11.5
1924	10.9	14.2	15.6	15.3	14.8	14.6	16.5	16.6	17.7	20.7	22.6	22.6	16.8
1925	23.4	22.4	21.2	20.2	18.6	21.6	19.7	20.7	21.2	19.5	18.5	17.1	20.3
1926	18.5	19.1	18.2	18.3	19.8	20.1	19.8	19.2	17.7	16.1	16.3	15.3	18.2
1927	15.3	14.9	15.8	16.2	15.4	14.8	14.2	13.9	13.5	14.7	14.5	14.2	18.5
1928	14.8	15.7	16.8	15.4	15.7	15.7	16.5	17.3	17.3	17.8	18.1	18.1	16.4
1929	18.3	18.4	18.0	17.6	17.1	16.8	16.3	16.1	15.8	13.9	11.6	9.9	15.7

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890–1919 are avilable in 1924 Yearbook, p. 832, Table 426.

[1] Derived from the figures upon which the monthly averages are based.

TABLE 533.—*Tea, Formosa, fine: Average wholesale price per pound, New York, 1920–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average [1]
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
Av. 1921–1925	30.3	30.3	30.3	30.2	29.9	29.8	29.8	29.8	30.0	30.4	31.6	32.3	30.4
1920	36.5	36.5	36.5	36.5	36.5	36.5	36.5	34.3	31.0	31.0	28.6	23.8	33.7
1921	24.5	24.5	24.5	24.1	22.4	22.0	22.0	22.0	22.3	23.0	28.0	29.0	24.0
1922	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.5	30.5	31.0	31.0	30.2
1923	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
1924	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.3	32.5	32.9	35.0	31.7
1925	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.3	35.0
1926	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.5	35.0	35.5
1927	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	32.9	32.5	34.2
1928	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	31.0	31.0	31.0	32.1
1929	32.2	33.0	33.0	33.0	33.0	32.5	31.0	31.0	31.0	31.0	31.0	30.4	31.8

Bureau of Agricultural Economics. Compiled from Bureau of Labor Statistics reports. Data for 1890–1919 are available in 1924 Yearbook, p. 834, Table 427.

[1] Derived from the figures upon which the monthly averages are based.

TABLE 534.—*Copra, South-Sea Island: Average price per pound, in bags, f. o. b. New York, 1917–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1917	8.2	8.2	8.1	8.5	9.1	9.3	8.6	9.4	9.3	9.2	9.8	9.5	8.9
1918	9.6	9.6	9.4	9.5	9.3	8.8	9.2	9.2	9.6	9.4	9.2	8.8	9.3
1919	8.8	7.5	6.6	7.5	9.5	10.6	10.9	10.8	10.2	9.9	(1)	(1)	------
1920	11.9	10.9	10.2	(1)	10.5	9.6	9.2	7.9	8.1	9.2	8.0	6.6	------
1921	5.8	5.0	4.5	4.6	5.1	5.0	4.6	4.6	5.0	4.7	4.2	4.4	5.0
1922	4.5	4.4	4.9	4.5	4.6	4.6	4.5	4.5	4.4	4.4	4.6	4.8	4.6
1923	5.1	5.2	5.8	6.0	5.5	4.9	4.6	4.6	4.8	5.2	5.2	5.4	5.2
1924	5.6	5.8	5.6	5.3	5.1	5.1	5.2	5.6	5.9	5.9	6.0	6.1	5.6
1925	6.1	6.0	5.9	5.9	5.9	5.9	5.9	6.2	6.2	6.2	6.2	6.2	6.0
1926	6.1	6.1	6.1	6.1	6.0	6.1	6.0	5.6	5.6	5.6	5.2	5.1	5.8
1927	5.0	5.3	5.1	5.1	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.3	5.2
1928	5.4	5.5	5.4	5.4	5.4	5.3	5.0	4.9	4.8	4.8	4.9	5.0	5.1
1929	4.8	4.8	4.7	4.6	4.3	4.0	4.4	4.2	4.4	4.5	4.3	4.4	4.4

Bureau of Agricultural Economics. Compiled from Oil, Paint, and Drug Reporter, 1917–1927; subsequently from Bureau of Labor Statistics Wholesale Price Bulletin.

[1] Nominal.

TABLE 535.—*Coconut oil, Manila: Average price per pound, in tanks, f. o. b., Pacific Coast, 1918–1929*

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1918	-------	-------	-------	-------	-------	-------	-------	-------	15.90	15.94	15.48	15.39	-------
1919	14.06	12.56	11.62	12.60	14.78	16.45	17.84	16.81	15.48	16.97	16.86	17.54	15.30
1920	18.82	17.50	17.13	16.88	16.78	14.80	12.75	13.12	13.75	12.75	11.75	9.52	14.63
1921	9.69	8.06	7.25	7.62	8.22	8.15	8.25	8.20	8.20	8.12	7.90	7.69	8.11
1922	7.66	7.46	7.62	7.50	7.44	7.00	7.03	6.95	6.70	6.88	7.45	7.80	7.29
1923	8.22	8.20	8.68	9.06	8.54	8.00	7.88	7.76	8.25	8.15	8.33	8.24	8.28
1924	8.40	8.31	8.22	8.01	7.80	7.81	8.31	9.34	8.58	9.19	9.75	10.02	8.64
1925	9.88	9.08	9.17	8.68	8.72	8.98	9.24	9.47	10.29	11.25	11.88	10.75	9.78
1926	10.24	9.67	9.82	9.56	9.56	10.26	9.47	8.78	8.94	8.28	8.09	7.84	9.21
1927	8.06	8.30	8.06	8.06	8.19	8.06	8.12	8.12	8.31	8.75	8.69	8.44	8.26
1928	8.38	8.12	8.25	8.31	8.25	8.06	8.44	7.69	7.69	7.81	7.94	8.12	8.09
1929	7.98	7.89	7.62	7.53	6.87	6.53	6.98	6.63	6.63	6.90	6.81	6.80	7.10

Bureau of Agricultural Economics. Compiled from weekly quotations in the Oil, Paint, and Drug Reporter. From 1918 through November, 1921, reported as 5 per cent acid.

TABLE 536.—*Farm wage rates and index numbers, 1866–1929*

[1910–1914 = 100]

Year	Average yearly farm wage [1]				Weighted average wage rate per month [2]	Index numbers of farm wages
	Per month—		Per day—			
	With board	Without board	With board	Without board		
	Doll.	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*
1866 [3]	10.09	15.50	0.64	0.90	13.14	55
1869	9.97	15.50	.63	.87	12.93	54
1874 or 1875	11.16	17.10	.68	.94	14.19	59
1877 or 1879 [4]	10.86	16.79	.61	.84	13.34	56
1879 or 1880	11.70	17.53	.64	.89	14.14	59
1880 or 1881	12.32	18.52	.67	.92	14.82	62
1881 or 1882	12.88	19.11	.70	.97	15.48	65
1884 or 1885	13.08	19.22	.71	.96	15.58	65
1887 or 1888	13.29	19.67	.72	.98	15.87	66
1889 or 1890	13.29	19.15	.72	.97	15.79	66
1891 or 1892	13.48	20.02	.73	.98	16.06	67
1893	13.85	19.97	.72	.92	15.93	67
1894	12.70	18.57	.65	.84	14.60	61
1895	12.75	18.74	.65	.85	14.69	62
1898	13.29	19.16	.71	.94	15.58	65
1899	13.90	19.97	.75	.99	16.34	68
1902	15.51	22.12	.83	1.09	18.12	76
1906	18.73	26.19	1.03	1.32	21.92	92
1909	20.48	28.09	1.04	1.31	23.00	96
1910	19.58	28.04	1.07	1.40	23.08	97
1911	19.85	28.33	1.07	1.40	23.25	97
1912	20.46	29.11	1.12	1.44	24.01	101
1913	21.27	30.21	1.15	1.48	24.82	104
1914	20.90	29.72	1.11	1.44	24.26	101
1915	21.08	29.97	1.12	1.45	24.46	102
1916	23.04	32.58	1.24	1.60	26.83	112
1917	28.64	40.19	1.56	2.00	33.42	140
1918	35.12	49.13	2.05	2.61	42.12	176
1919	40.14	56.77	2.44	3.10	49.11	206
1920	47.24	65.05	2.84	3.56	57.01	239
1921	30.25	43.58	1.66	2.17	35.77	150
1922	29.31	42.09	1.64	2.14	34.91	146
1923	33.09	46.74	1.91	2.45	39.64	166
1924 [5]	33.34	47.22	1.88	2.44	39.67	166

Year	Average yearly farm wage [1]				Weighted average wage rate per month [2]	Index numbers of farm wages
	Per month—		Per month—			
	With board	Without board	With board	Without board		
	Doll.	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*
1925 [5]	33.88	47.80	1.89	2.46	40.20	168
1926 [5]	34.86	48.86	1.91	2.48	40.88	171
1927 [5]	34.58	48.63	1.90	2.46	40.60	170
1928 [5]	34.66	48.65	1.88	2.43	40.44	169
1929 [5]	-----	-----	-----	-----	-----	-----
1923—January	27.87	40.50	1.46	1.97	32.61	137
April	30.90	44.41	1.55	2.09	35.42	148
July	34.64	48.61	1.84	2.44	40.30	169
October	34.56	48.42	2.02	2.58	41.52	174
1924—January	31.55	45.53	1.79	2.38	38.01	159
April	33.57	47.38	1.77	2.34	38.95	163
July	34.34	48.02	1.87	2.43	40.15	168
October	34.38	48.46	1.93	2.51	40.81	171
1925—January	31.07	45.04	1.74	2.31	37.24	156
April	33.86	47.40	1.77	2.33	39.04	164
July	34.94	48.53	1.89	2.44	40.62	170
October	34.91	48.99	1.95	2.53	41.28	173
1926—January	31.82	46.26	1.76	2.33	37.94	159
April	34.38	48.40	1.78	2.35	39.56	166
July	36.10	49.89	1.91	2.47	41.55	174
October	36.00	50.10	1.97	2.55	42.10	176
1927—January	32.94	47.07	1.79	2.36	38.79	162
April	34.53	48.47	1.78	2.37	39.71	166
July	35.59	49.52	1.89	2.44	41.07	172
October	35.68	49.77	1.96	2.51	41.71	175
1928—January	32.50	46.75	1.76	2.34	38.35	161
April	34.46	48.44	1.78	2.34	39.56	166
July	35.39	49.32	1.84	2.39	40.55	170
October	35.75	49.60	1.96	2.51	41.71	175
1929—January	33.04	47.24	1.78	2.34	38.75	162
April	34.68	49.00	1.79	2.34	39.80	167
July	36.08	50.53	1.89	2.43	41.42	173
October	35.90	50.00	1.92	2.46	41.49	174

Bureau of Agricultural Economics.

[1] Yearly averages are from reports by crop reporters, giving average wages for the year in their localities.
[2] This column has significance only as an essential step in computing the wage index.
[3] Years 1866 to 1878 in gold.
[4] 1877 or 1878, 1878 or 1879 (combined).
[5] Weighted average of quarterly reports, April (weight 1), July (weight 5), October (weight 5), and January of the following year (weight 1).

TABLE 537.—*Wages: Male farm labor, by States, quarterly, 1929*

State and division	Per month, with board				Per month, without board				Per day, with board [1]				Per day, without board			
	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.	Jan.	Apr.	July	Oct.
	Doll.	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*	*Doll.*
Maine	40.00	43.00	50.25	49.00	62.00	64.00	66.50	71.00	2.25	2.30	2.45	2.80	2.90	3.00	3.10	3.45
New Hampshire	45.00	48.00	53.50	49.00	72.00	75.00	81.00	72.00	2.60	2.35	2.70	2.60	3.40	3.35	3.60	3.50
Vermont	47.00	48.00	51.25	49.00	68.00	71.00	73.25	72.00	2.15	2.40	2.60	2.60	3.25	3.20	3.35	3.45
Massachusetts	49.00	50.00	53.75	51.00	77.00	82.00	84.00	80.00	2.50	2.45	2.95	2.80	3.65	3.65	3.80	3.80
Rhode Island	50.00	54.00	54.00	56.00	80.00	86.00	86.75	85.00	2.60	2.75	2.95	2.80	3.65	3.60	3.85	3.85
Connecticut	52.00	56.00	54.75	54.00	81.00	84.00	84.00	86.00	2.70	2.90	2.85	3.10	3.80	3.75	3.85	4.00
New York	44.75	49.25	50.25	50.50	66.00	70.25	72.25	70.75	2.70	2.80	3.05	3.05	3.55	3.65	3.85	3.85
New Jersey	48.00	49.25	50.50	51.00	71.00	72.50	72.50	76.00	2.80	2.65	2.75	2.75	3.60	3.50	3.55	3.65
Pennsylvania	37.25	38.25	41.00	40.25	59.00	58.75	62.00	60.00	2.45	2.45	2.55	2.60	3.20	3.20	3.25	3.30
North Atlantic	43.48	46.12	48.35	47.72	66.22	68.74	70.97	69.90	2.56	2.60	2.79	2.83	3.42	3.44	3.57	3.63
Ohio	37.75	37.00	38.75	38.75	53.50	52.75	54.00	54.50	2.30	2.30	2.40	2.50	3.00	3.05	3.05	3.15
Indiana	34.75	36.50	38.75	37.25	47.25	49.50	51.75	50.00	2.00	2.05	2.20	2.30	2.60	2.60	2.75	2.85
Illinois	41.00	43.00	43.25	43.00	53.25	55.00	56.00	55.25	2.25	2.20	2.30	2.40	2.90	2.75	2.90	2.90
Michigan	39.25	42.50	43.75	44.25	55.25	60.50	61.50	61.75	2.50	2.60	2.65	2.75	3.25	3.30	3.35	3.35
Wisconsin	40.00	48.00	50.50	49.25	57.75	66.00	69.50	67.50	2.30	2.30	2.55	2.55	2.90	3.00	3.25	3.15
Minnesota	33.25	44.50	47.75	46.25	49.50	60.50	65.00	63.00	1.95	2.25	2.40	2.60	2.75	3.05	3.20	3.40
Iowa	44.00	49.00	49.00	48.75	56.00	59.75	60.25	60.25	2.40	2.40	2.55	2.55	3.00	3.05	3.15	3.20
Missouri	33.00	33.25	34.25	34.50	44.00	44.50	45.25	45.75	1.65	1.60	1.75	1.75	2.15	2.15	2.20	2.15
North Dakota	27.75	45.75	48.25	47.75	43.00	65.50	66.50	63.75	1.70	2.25	2.45	2.45	2.55	3.10	3.25	3.75
South Dakota	35.00	46.50	49.50	46.50	51.00	65.75	67.00	66.75	2.15	2.35	2.40	2.80	3.05	3.20	3.30	3.55
Nebraska	40.75	44.00	45.25	44.00	55.75	59.00	60.00	57.75	2.40	2.35	2.45	2.50	3.15	3.10	3.35	3.30
Kansas	37.00	37.25	39.25	39.00	52.00	52.75	55.00	54.75	2.45	2.25	2.65	2.50	3.10	2.95	3.35	3.20
North Central	37.49	41.81	43.40	42.79	51.74	56.44	58.18	57.41	2.17	2.21	2.36	2.43	2.83	2.88	3.02	3.07
Delaware	33.00	37.25	37.00	35.50	47.00	55.00	55.50	53.50	2.25	2.20	2.25	2.40	3.00	2.75	2.75	3.05
Maryland	34.75	35.00	36.00	35.25	50.25	50.50	52.25	50.75	1.95	1.95	2.10	2.20	2.65	2.60	2.75	2.85
Virginia	30.00	30.00	30.00	31.00	41.00	43.00	43.00	43.00	1.55	1.55	1.55	1.60	2.00	2.00	2.05	2.00
West Virginia	32.25	30.50	32.50	33.50	47.25	46.25	46.50	48.50	1.65	1.65	1.65	1.65	2.20	2.25	2.30	2.30
North Carolina	27.00	26.25	26.75	28.75	40.00	38.50	38.25	39.25	1.40	1.40	1.40	1.40	1.85	1.80	1.80	1.80
South Carolina	19.00	19.25	19.00	19.50	27.00	26.75	26.75	27.50	1.00	.95	1.00	.95	1.25	1.25	1.20	1.20
Georgia	18.50	18.25	19.75	19.50	26.50	26.25	28.00	27.75	1.00	1.00	1.00	1.05	1.30	1.25	1.30	1.35
Florida	23.00	22.00	24.50	23.75	35.00	34.50	36.50	36.25	1.15	1.15	1.20	1.15	1.55	1.55	1.65	1.60
South Atlantic	24.47	24.20	24.98	25.52	35.18	35.10	35.77	36.02	1.29	1.28	1.31	1.32	1.69	1.66	1.70	1.71
Kentucky	25.75	26.25	27.00	27.50	36.25	36.50	38.25	38.75	1.30	1.30	1.40	1.40	1.70	1.65	1.80	1.80
Tennessee	23.00	23.50	24.00	25.00	32.50	32.75	33.50	34.75	1.15	1.10	1.15	1.20	1.50	1.55	1.55	1.50
Alabama	22.00	21.00	22.00	21.00	31.00	30.00	30.00	27.00	1.10	1.10	1.10	1.10	1.50	1.50	1.40	1.40
Mississippi	21.75	22.00	23.25	22.50	31.50	31.50	32.75	32.25	1.15	1.15	1.15	1.15	1.50	1.55	1.55	1.60
Arkansas	25.00	24.00	26.50	24.50	36.00	34.50	38.00	35.25	1.20	1.20	1.30	1.30	1.50	1.60	1.65	1.70
Louisiana	25.00	24.00	26.50	24.50	36.00	36.75	39.75	37.75	1.25	1.20	1.20	1.25	1.60	1.50	1.50	1.55
Oklahoma	27.75	28.25	29.00	30.50	40.75	41.50	41.50	42.50	1.55	1.50	1.75	1.70	2.15	1.95	2.05	2.20
Texas	28.75	28.25	30.00	29.00	41.50	40.75	42.50	42.00	1.45	1.40	1.55	1.45	1.85	1.80	1.95	1.90
South Central	25.26	25.00	26.39	25.86	36.23	35.95	37.44	36.70	1.28	1.26	1.34	1.32	1.68	1.65	1.71	1.72
Montana	46.25	54.50	57.50	57.25	67.50	74.75	78.75	77.00	2.60	2.60	2.85	3.05	3.60	3.70	3.70	3.80
Idaho	47.00	55.00	60.25	58.00	69.50	76.25	81.75	80.75	2.45	2.55	2.85	2.90	3.10	3.15	3.50	3.80
Wyoming	49.50	49.75	51.50	53.00	68.00	72.25	75.50	75.75	2.40	2.35	2.60	2.65	3.15	3.15	3.45	3.45
Colorado	40.00	41.25	42.50	45.50	61.00	62.50	63.75	66.50	2.40	2.30	2.30	2.45	3.00	2.95	3.05	3.00
New Mexico	35.25	34.75	36.00	36.00	50.00	51.00	52.00	52.00	1.75	1.65	1.80	1.90	2.20	2.05	2.20	2.30
Arizona	52.00	49.00	55.00	50.00	66.00	71.50	71.00	66.50	2.05	2.00	2.15	1.90	2.50	2.55	2.75	2.60
Utah	53.45	55.25	63.50	64.75	72.50	73.75	83.75	82.50	2.40	2.30	2.60	2.55	3.05	3.00	3.25	3.25
Nevada	63.00	58.00	60.25	65.00	81.00	75.50	83.00	91.00	2.40	2.35	2.50	2.75	3.10	3.25	3.25	3.75
Washington	45.00	52.00	51.75	54.50	70.00	74.50	78.25	78.00	2.55	2.50	2.65	2.80	3.45	3.40	3.65	3.65
Oregon	46.00	49.00	51.25	54.00	67.75	71.25	74.50	74.00	2.35	2.40	2.45	2.70	3.10	3.10	3.20	3.40
California	62.00	62.00	62.00	64.00	90.00	90.00	90.00	90.00	2.60	2.60	2.60	2.60	3.60	3.55	3.55	3.60
Far Western	51.54	53.94	55.28	56.54	74.72	76.99	79.11	78.93	2.44	2.42	2.51	2.57	3.24	3.21	3.32	3.39
United States	33.04	34.68	36.08	35.90	47.24	49.00	50.53	50.00	1.78	1.79	1.89	1.92	2.34	2.34	2.43	2.46

Bureau of Agricultural Economics. As reported by field aid crop reporters.

[1] Includes piecework.

TABLE 538.—*Percentages of farmers reporting hiring farm laborers, United States, 1927*

[9,531 reports=100 per cent]

Class of labor and geographic division	Number of reports	In January	In February	In March	In April	In May	In June
Class of labor:	*Number*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Month, with board		17.2	17.8	21.7	24.7	25.7	26.0
Month, without board		13.2	13.4	14.7	15.2	15.3	15.5
Day, with board		7.2	6.2	8.3	9.7	11.4	15.0
Day, without board		8.8	9.0	10.0	11.0	12.6	13.9
One or more classes		39.6	40.1	46.5	50.9	53.8	56.2
Geographic divisions:							
New England	332	58.4	58.1	62.0	64.8	70.5	67.8
Middle Atlantic	1,101	42.1	41.8	46.5	52.9	54.7	56.3
East North Central	2,156	34.6	35.3	43.0	47.6	50.0	52.4
West North Central	2,402	36.6	36.9	45.1	50.5	53.0	56.5
South Atlantic	992	48.0	48.1	53.4	55.3	58.7	59.8
East South Central	776	42.3	42.7	48.8	51.4	52.8	54.5
West South Central	1,053	39.0	41.2	45.3	47.1	53.1	56.4
Mountain	390	33.6	33.8	39.5	50.8	54.6	55.4
Pacific	329	44.4	44.7	50.2	52.9	53.2	60.2
United States	9,531	39.6	40.1	46.5	50.9	53.8	56.2

Class of labor and geographic division	In July	In August	In September	In October	In November	In December	During the year 1927
Class of labor:	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Month, with board	26.1	24.7	23.5	22.5	20.6	17.9	30.9
Month, without board	15.3	14.8	14.5	14.4	13.8	12.9	17.6
Day, with board	21.9	19.8	18.8	17.4	15.5	9.0	38.5
Day, without board	15.9	14.3	16.0	16.3	14.2	9.9	28.7
One or more classes	61.2	57.2	56.8	55.8	52.0	42.4	76.4
Geographic divisions:							
New England	78.9	74.1	72.9	71.4	66.9	58.7	86.4
Middle Atlantic	67.8	63.5	61.8	61.9	54.0	45.7	79.0
East North Central	59.8	55.7	53.3	53.3	48.5	38.3	72.2
West North Central	63.2	59.3	55.0	52.2	53.2	41.4	78.1
South Atlantic	61.6	56.2	61.2	61.4	59.1	49.1	75.2
East South Central	51.2	45.5	52.3	51.5	50.3	43.4	69.6
West South Central	50.6	48.4	53.5	55.4	47.9	39.8	76.7
Mountain	62.6	63.3	64.9	57.4	46.4	35.9	84.1
Pacific	69.6	64.1	57.4	54.4	48.0	41.6	83.3
United States	61.2	57.2	56.8	55.8	52.0	42.4	76.4

Bureau of Agricultural Economics. The reports were those of voluntary correspondents of the Department of Agriculture.

TABLE 539.—*Total cash wages paid to hired farm laborers per farm reporting hiring labor of designated classes, United States, 1927*

Class of labor and geographic division	In January	In February	In March	In April	In May	In June	In July
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Class of labor:							
Month, with board	54.00	51.30	54.15	59.91	64.59	67.56	73.20
Month, without board	83.68	83.19	86.53	95.04	97.59	104.81	106.87
Day, with board	22.82	20.14	22.38	26.27	29.47	37.48	44.11
Day, without board	50.02	43.03	44.34	50.15	54.05	60.02	70.47
One or more classes	66.48	63.49	66.12	73.18	77.68	85.12	92.10
Geographic divisions:							
New England	110.27	104.84	105.26	112.10	115.95	128.64	150.57
Middle Atlantic	66.60	65.48	67.19	72.48	74.95	84.02	85.97
East North Central	50.53	49.25	53.86	59.86	63.37	67.08	71.42
West North Central	51.13	49.47	53.50	62.64	66.29	70.21	80.44
South Atlantic	58.77	59.26	61.79	68.47	69.81	76.26	81.82
East South Central	37.05	36.42	37.67	43.43	46.81	55.42	53.42
West South Central	68.16	63.35	63.56	72.30	72.40	81.59	89.94
Mountain	108.20	109.16	110.18	111.52	123.10	149.07	146.19
Pacific	231.00	195.40	211.16	221.52	266.81	274.81	280.68
United States	66.48	63.49	66.12	73.18	77.68	85.12	92.10

Class of labor and geographic division	In August	In September	In October	In November	In December	During year 1927
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Class of labor:						
Month, with board	73.88	70.71	65.94	63.80	58.10	554.76
Month, without board	110.62	112.12	110.36	96.49	90.39	967.80
Day, with board	46.77	53.07	46.20	45.43	35.80	164.81
Day, without board	72.39	84.88	96.92	69.18	59.14	349.09
One or more classes	94.83	99.39	97.93	83.15	73.64	661.22
Geographic divisions:						
New England	143.96	149.63	148.75	117.58	119.31	1,181.84
Middle Atlantic	84.67	90.66	94.98	75.20	66.91	647.10
East North Central	77.02	68.56	74.55	66.49	63.28	514.69
West North Central	85.21	102.19	87.25	79.84	64.10	563.00
South Atlantic	79.77	82.51	87.05	64.51	59.93	639.45
East South Central	51.91	51.99	50.22	42.37	40.67	387.77
West South Central	80.82	98.74	106.13	96.95	79.76	618.23
Mountain	182.71	152.73	156.09	128.66	119.64	977.11
Pacific	279.96	320.89	311.07	275.42	228.96	2,012.78
United States	94.83	99.39	97.93	83.15	73.64	661.22

Bureau of Agricultural Economics. The reports were those of voluntary correspondents of the Department of Agriculture.

TABLE 540.—*Farm real estate: Index numbers of estimated value per acre, by geographic divisions and States, 1912–1929* [1]

[1912–1914=100 per cent]

Geographic division and State	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
United States	97	100	103	103	108	117	129	140	170	157	139	135	130	127	124	119	117	116
Geographic divisions:																		
New England	99	101	100	99	102	112	117	123	140	135	134	130	128	127	128	127	127	126
Middle Atlantic	98	100	102	100	104	112	117	121	136	127	118	116	114	114	113	111	110	109
East North Central	97	100	103	103	110	116	127	135	161	151	132	128	121	116	111	104	101	100
West North Central	97	100	103	105	114	122	134	147	184	174	150	142	132	126	121	115	113	112
South Atlantic	98	100	103	98	108	119	135	161	198	174	146	152	151	148	149	137	134	133
East South Central	97	100	103	99	109	120	140	162	199	163	149	149	142	141	139	133	130	129
West South Central	96	100	104	100	103	116	134	143	177	159	136	132	136	144	144	139	137	136
Mountain	98	102	100	98	98	106	117	130	151	133	122	115	110	105	103	101	101	101
Pacific	94	99	106	107	111	122	129	134	156	155	151	148	147	146	144	143	142	142
New England:																		
Maine	100	102	98	96	98	110	115	124	142	132	127	129	127	124	126	124	124	122
New Hampshire	97	101	102	101	98	103	111	116	129	123	126	111	109	111	113	112	112	111
Vermont	101	101	98	104	115	127	133	136	150	150	145	134	130	125	126	125	123	123
Massachusetts	98	100	102	98	100	110	114	119	140	134	134	132	131	132	134	131	131	131
Rhode Island	100	101	100	102	106	112	118	123	130	130	127	124	126	128	130	133	134	134
Connecticut	98	100	102	100	102	110	116	121	137	134	140	137	140	137	137	138	139	139
Middle Atlantic:																		
New York	98	100	102	100	103	109	115	118	133	123	116	115	112	111	109	108	106	105
New Jersey	98	100	102	100	102	111	115	119	130	130	121	115	120	124	129	128	127	127
Pennsylvania	98	100	102	100	105	114	119	124	140	131	120	118	116	114	114	112	111	110
East North Central:																		
Ohio	98	100	102	107	113	119	131	135	159	134	124	122	118	110	105	99	96	94
Indiana	98	100	102	101	110	116	128	135	161	147	119	115	108	102	95	87	84	83
Illinois	97	100	103	102	105	111	119	130	160	153	126	123	116	115	109	99	96	95
Michigan	98	99	103	105	111	120	134	137	154	152	148	145	138	133	129	127	125	124
Wisconsin	97	100	103	104	117	124	133	143	171	168	154	147	139	130	125	122	120	119
West North Central:																		
Minnesota	95	100	105	107	122	138	155	167	213	212	187	177	170	159	155	145	140	138
Iowa	96	99	104	112	128	134	145	160	213	197	162	156	143	136	130	121	117	116
Missouri	97	100	103	102	108	115	125	137	167	156	133	127	117	112	104	99	96	95
North Dakota	97	100	103	103	112	118	124	130	145	141	136	128	114	109	105	100	99	98
South Dakota	96	101	103	101	108	116	126	145	181	173	146	126	117	115	107	97	96	95
Nebraska	98	100	102	101	104	110	127	145	179	166	144	139	128	123	123	119	117	116
Kansas	101	99	99	103	109	115	122	132	151	149	130	127	118	115	113	113	113	113
South Atlantic:																		
Delaware	100	101	99	100	105	115	124	129	139	129	119	119	107	112	114	111	111	111
Maryland	97	100	103	104	109	118	129	136	166	146	141	136	133	131	130	126	124	123
Virginia	97	100	103	97	117	125	142	167	189	180	157	170	162	154	148	138	137	136
West Virginia	97	100	103	101	104	112	122	135	154	141	125	127	125	120	116	110	109	108
North Carolina	97	99	104	102	114	130	152	176	223	196	166	195	192	187	185	178	174	171
South Carolina	101	98	101	94	98	107	122	162	230	186	126	128	136	138	128	113	110	110
Georgia	98	101	101	94	105	116	131	172	217	172	136	125	123	116	112	104	102	101
Florida	96	99	105	97	103	109	126	143	178	176	157	155	163	172	223	183	176	174
East South Central:																		
Kentucky	97	100	103	100	111	127	146	170	200	172	151	147	141	140	139	134	130	129
Tennessee	96	100	104	100	110	121	145	168	200	169	154	158	148	137	134	130	127	125
Alabama	98	98	103	98	98	103	128	143	177	147	135	143	144	154	154	145	145	143
Mississippi	97	102	102	97	111	121	131	155	218	150	148	143	134	136	134	126	123	122
West South Central:																		
Arkansas	98	101	101	95	109	129	149	169	222	186	174	170	160	160	153	150	147	145
Louisiana	99	102	99	95	106	112	143	157	198	163	140	144	137	141	143	135	132	132
Oklahoma	98	101	101	95	104	114	130	140	166	160	139	133	125	131	130	128	127	127
Texas	95	100	105	103	103	115	133	141	174	156	133	128	137	146	146	141	139	138
Mountain:																		
Montana	97	100	103	100	94	100	106	114	126	105	96	87	81	75	72	70	71	72
Idaho	100	101	99	96	99	114	130	146	172	162	136	133	129	123	119	117	116	116
Wyoming	97	103	100	103	94	97	121	147	176	146	134	121	112	100	95	94	95	96
Colorado	98	103	98	93	102	107	110	118	141	132	123	113	98	92	89	82	82	82
New Mexico	100	104	96	100	96	111	118	127	144	125	115	110	110	108	106	108	108	109
Arizona	95	100	105	97	95	105	125	140	165	148	135	124	128	121	125	123	122	123
Utah	100	102	98	98	104	117	122	144	167	137	133	133	131	130	129	128	127	127
Nevada	96	100	103	102	99	96	103	117	135	123	119	112	108	102	99	99	99	99
Pacific:																		
Washington	98	100	103	100	102	112	118	122	140	132	124	117	115	113	112	111	110	110
Oregon	97	100	103	99	100	104	112	118	130	130	122	115	113	110	107	106	106	106
California	93	99	108	111	116	130	136	142	167	168	166	165	164	164	163	162	161	160

Bureau of Agricultural Economics. Based on values as reported by crop reporters. Values as reported by the census for 1910, 1920, and 1925 will be found in Table 511 of the 1927 Yearbook.

[1] All farm land with improvements, as of Mar. 1. Owing to rounding of figures, 1912–1914 will not always equal exactly 100 per cent.

NOTE.—A table similar to Table 511, 1927 Yearbook, census figures on value of farm lands and buildings, is omitted.

TABLE 541.—*Number of farms per 1,000 changing ownership by various methods, by States and geographic divisions, 12 months ended March 15, 1926–1929*

Geographic division and State	Voluntary sales and trades [1]				Forced sales and related defaults: Delinquent taxes				Forced sales and related defaults: Foreclosure of mortgage, bankruptcy, etc.[2]				Forced sales and related defaults: Total				Inheritance and gift				Administrators' and executors' sales [3]			Miscellaneous and unclassified				Total, all classes			
	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929	1927	1928	1929	1926	1927	1928	1929	1926	1927	1928	1929
United States	29.6	28.3	26.3	23.5	4.2	5.1	5.2	4.7	17.4	18.2	17.6	14.7	21.6	23.3	22.8	19.4	8.0	8.8	8.9	8.5	7.0	6.7	5.4	2.2	1.1	1.3	1.1	61.4	63.5	66.0	57.9
New England	34.0	32.4	34.9	30.4	4.5	3.8	3.0	3.6	9.3	8.6	7.7	7.3	13.8	12.4	10.7	10.9	8.4	9.9	10.4	9.6	7.5	7.1	6.5	1.9	0.7	1.0	0.8	58.1	62.9	64.1	58.2
Middle Atlantic	35.4	37.0	33.7	28.2	3.0	3.0	3.4	3.6	8.8	8.8	8.4	8.4	11.8	11.8	11.8	12.0	8.3	8.8	8.6	8.0	8.7	8.2	7.2	2.5	1.5	1.8	1.2	58.0	67.8	64.1	56.6
East North Central	25.8	25.8	24.0	21.0	3.2	3.8	4.2	3.3	15.7	16.6	16.5	15.8	18.9	20.4	20.7	19.1	8.5	9.8	9.7	8.9	9.1	8.3	6.7	2.0	1.4	1.2	1.3	55.2	66.5	63.9	57.0
West North Central	23.0	24.3	23.9	22.4	4.3	5.3	5.1	3.6	26.5	26.7	27.3	21.9	30.8	32.0	32.4	25.5	8.0	8.1	8.4	8.5	6.5	6.5	6.1	2.5	1.3	1.5	1.2	64.3	72.2	72.7	63.7
South Atlantic	28.0	24.2	20.0	18.3	5.5	6.9	6.9	9.0	14.0	14.1	16.4	14.0	19.5	21.0	23.3	23.0	9.7	10.2	10.6	10.4	7.7	7.9	7.5	1.9	0.9	1.1	1.1	59.1	64.0	62.9	60.3
East South Central	33.5	29.3	27.5	23.4	4.0	5.8	5.4	4.0	12.4	15.9	14.6	11.2	16.4	21.7	20.0	15.2	8.1	9.3	9.2	8.8	7.5	6.6	5.4	1.8	0.8	1.1	0.9	59.8	68.6	64.4	58.7
West South Central	34.7	31.1	27.9	25.5	3.4	3.8	4.1	3.2	15.3	16.1	14.4	12.0	18.7	19.9	18.5	15.2	6.7	7.8	7.8	7.2	4.4	4.2	3.6	2.2	0.7	1.2	1.0	62.3	63.9	59.6	52.5
Mountain	32.0	33.7	34.8	35.6	9.8	9.5	12.0	10.8	40.4	35.8	27.4	18.3	50.2	45.3	39.4	29.1	5.0	5.8	5.6	6.0	4.4	3.7	4.1	3.5	2.3	1.9	1.4	90.7	91.5	85.4	76.2
Pacific	35.6	36.3	34.3	28.3	3.9	4.5	4.2	3.9	16.7	15.6	15.7	13.6	20.6	20.1	19.9	17.5	6.2	6.9	7.1	6.5	4.0	4.4	3.7	3.3	1.4	1.4	1.5	65.7	68.7	67.1	57.5
New Engalnd:																															
Maine	31.7	32.8	33.2	29.1	6.7	6.0	5.2	7.8	11.1	10.5	8.8	11.0	17.8	16.5	14.0	18.8	8.3	11.8	11.5	12.9	6.5	5.7	4.5	2.5	0.6	1.0	0.4	60.3	68.2	65.4	65.7
New Hampshire	34.4	33.5	37.8	29.7	6.1	5.0	5.1	2.5	6.9	8.8	9.0	4.6	13.0	13.8	14.1	7.1	7.4	8.4	7.9	7.3	6.0	5.0	5.7	1.9	0.4	0.5	0.5	56.7	62.1	65.3	50.3
Vermont	46.0	42.6	40.6	33.7	1.3	1.7	1.2	0.9	11.9	10.8	8.8	8.0	13.2	12.5	10.0	8.9	8.8	10.4	10.9	8.5	9.8	10.2	12.0	1.9	1.0	1.5	1.4	69.9	76.3	73.2	64.5
Massachusetts	31.3	28.0	35.1	32.6	2.1	2.0	1.3	2.2	5.5	6.0	5.7	6.2	7.6	8.0	7.0	8.4	8.6	8.3	9.5	8.3	6.8	6.0	4.0	1.4	0.3	0.9	1.4	48.9	51.4	58.5	54.7
Rhode Island	39.6	35.0	30.0	25.8	6.9	4.0	1.2	1.0	7.3	6.5	2.5	5.5	16.2	10.5	3.7	6.5	9.9	9.0	8.9	10.8	8.0	5.0	2.0	4.2	0.0	0.5	0.0	69.9	62.5	48.1	45.1
Connecticut	27.1	23.9	29.7	27.8	5.2	3.0	1.0	0.9	9.9	6.0	3.0	3.0	15.1	9.0	4.0	3.9	8.2	9.0	11.0	7.3	9.1	10.5	9.0	1.0	1.5	0.8	0.4	51.4	52.5	56.0	48.4
Middel Atlantic:																															
New York	33.4	37.5	35.6	30.1	4.1	3.9	5.2	5.2	10.8	12.7	12.2	12.0	14.9	16.6	17.4	17.2	8.7	10.4	9.2	8.1	8.0	7.5	5.9	2.7	1.8	1.9	1.5	59.7	74.3	71.6	62.8
New Jersey	59.4	54.4	44.4	30.8	2.8	3.4	4.0	2.0	7.8	6.0	6.9	4.0	10.6	9.4	10.9	6.0	7.5	7.0	7.2	6.2	6.8	9.3	5.0	0.6	0.4	0.9	0.8	78.1	78.0	72.7	48.8
Pennsylvania	33.7	34.0	30.2	26.0	1.9	2.1	1.7	2.4	7.0	5.6	5.5	5.6	8.9	7.7	7.2	8.0	8.0	7.6	8.2	8.1	9.6	8.6	8.8	2.5	1.3	1.9	1.0	53.1	60.2	56.1	51.9
East North Central:																															
Ohio	29.8	30.8	27.3	23.1	1.6	2.1	1.8	1.5	11.2	11.5	11.4	13.3	12.8	13.6	13.2	14.8	8.1	9.0	9.1	9.2	9.7	9.2	8.3	2.3	1.2	1.0	1.0	53.0	64.3	59.8	56.4
Indiana	26.8	25.8	23.6	19.2	4.2	5.4	6.3	5.4	14.0	16.9	17.3	15.7	18.2	22.3	23.6	21.1	9.0	10.5	9.9	10.0	10.5	9.8	7.6	2.2	1.0	0.8	1.2	56.2	70.1	67.7	59.1
Illinois	22.3	21.7	20.0	19.7	1.4	1.8	3.1	1.9	15.7	16.8	17.9	16.7	17.1	18.6	21.0	18.6	10.5	12.4	12.7	11.9	11.0	9.5	8.4	1.2	1.4	1.0	0.5	51.1	65.1	64.2	59.1
Michigan	30.8	30.5	30.5	24.8	4.6	6.4	7.0	4.7	16.6	18.8	18.0	17.1	21.2	25.2	25.0	21.8	8.9	9.8	10.0	7.3	7.9	6.9	4.1	1.7	1.2	1.5	2.1	62.6	74.6	73.9	60.1
Wisconsin	18.9	19.8	18.2	18.1	4.8	4.0	3.7	3.5	22.4	20.5	19.0	16.5	27.2	24.5	22.7	20.0	5.7	6.9	6.2	5.7	5.8	5.4	4.6	2.7	2.0	1.8	1.9	54.5	59.0	54.3	50.3
West North Central:																															
Minnesota	18.0	18.5	18.4	16.8	3.8	4.5	5.5	3.7	26.8	24.7	26.4	26.4	30.6	29.2	31.9	30.1	6.7	6.7	6.3	6.6	5.3	4.3	4.2	2.6	1.7	1.5	0.8	57.9	61.4	62.4	58.5
Iowa	15.5	18.7	17.2	17.4	2.6	2.5	2.3	2.0	26.9	27.3	28.1	25.2	29.5	29.8	30.4	27.2	7.7	8.5	8.6	8.6	7.0	7.6	7.1	2.0	1.2	1.4	1.3	54.7	65.2	65.2	61.6
Missouri	29.9	29.9	27.7	26.7	2.4	4.0	3.7	3.5	21.4	22.7	24.1	21.7	23.8	26.7	27.8	25.2	9.4	9.5	9.6	10.1	6.6	6.8	5.7	3.1	1.1	1.8	1.0	66.2	73.8	73.7	68.7
North Dakota	23.9	23.9	28.6	26.6	12.7	18.1	16.5	10.7	46.3	43.0	39.4	27.0	59.0	61.1	55.9	37.7	6.7	6.5	8.0	8.6	5.1	5.2	5.5	2.2	1.0	0.8	1.8	91.8	97.6	98.5	80.2
South Dakota	16.7	20.8	26.9	21.1	13.6	15.0	11.1	7.8	52.5	51.1	46.8	27.2	66.1	66.1	57.9	35.0	8.6	8.0	8.1	8.2	5.5	5.2	5.8	1.6	1.3	1.5	1.7	93.0	101.7	99.6	71.8

Nebraska	23.4	26.2	26.4	26.5	2.2	3.2	3.4	1.9	21.9	25.3	24.9	15.7	24.1	28.5	28.3	17.6	7.3	8.0	8.4	8.6	7.8	9.2	8.1	2.6	1.4	2.0	1.6	57.4	71.9	74.3	62.4
Kansas	29.7	29.6	27.3	24.1	3.0	2.9	3.6	1.5	15.8	16.0	19.4	13.0	18.8	18.9	23.0	14.5	8.3	8.1	9.1	8.3	7.2	6.5	6.8	2.5	1.2	1.2	0.8	59.3	65.0	67.1	54.5
South Atlantic:																														
Delaware	22.7	20.9	17.9	24.4	2.5	2.5	2.0	1.5	10.3	10.0	8.0	9.9	12.8	12.5	10.0	11.4	7.5	9.5	9.6	9.2	10.0	9.7	5.4	0.0	0.5	0.9	0.2	43.0	53.4	48.1	50.6
Maryland	32.3	30.0	28.5	23.6	4.7	5.0	3.8	5.1	9.5	12.2	13.6	13.6	14.2	17.2	17.4	18.7	7.8	9.4	8.1	9.8	9.2	7.8	10.8	1.4	0.6	0.8	0.9	55.7	66.4	62.6	63.8
District of Columbia	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Virginia	23.2	19.3	17.3	16.3	3.2	2.5	2.6	3.5	13.8	11.8	12.0	10.6	17.0	14.3	14.6	14.1	10.6	10.2	11.0	9.1	6.8	7.2	6.2	2.0	0.3	1.0	0.9	52.8	50.9	51.1	46.6
West Virginia	30.1	28.2	22.5	19.1	7.0	9.4	10.2	10.0	8.4	7.8	7.6	6.6	15.4	17.2	17.8	16.6	10.5	13.8	13.0	12.3	6.8	5.0	5.6	2.2	1.6	1.1	0.9	58.2	67.6	59.4	54.5
North Carolina	25.0	21.3	19.1	19.2	5.9	8.6	8.4	13.7	8.7	11.5	14.0	15.0	14.6	20.1	22.4	28.7	9.2	11.1	10.1	12.7	8.8	8.8	8.5	1.9	1.6	1.1	1.2	50.7	62.9	61.5	70.3
South Carolina	18.0	14.7	14.1	14.4	5.2	8.1	8.6	11.7	21.5	22.6	27.6	22.2	26.7	30.7	36.2	33.9	10.4	8.0	11.5	9.0	7.0	9.2	8.0	2.3	0.4	1.0	1.8	57.4	60.8	72.0	67.1
Georgia	25.3	24.0	21.3	17.9	6.6	8.2	6.0	7.7	22.3	19.7	23.7	17.4	28.9	27.9	29.7	25.1	11.0	10.7	11.9	9.9	9.0	9.9	9.3	2.5	0.8	1.5	1.2	67.7	72.4	74.3	63.4
Florida	81.0	63.5	31.7	23.4	7.2	6.6	11.7	8.6	8.9	8.5	12.4	6.0	16.1	15.1	24.1	14.6	4.6	4.3	4.2	7.2	3.0	2.7	1.5	0.0	0.5	0.0	0.3	101.7	86.4	62.7	47.0
East South Central:																														
Kentucky	35.3	31.0	30.5	25.7	5.0	7.5	8.0	4.5	12.2	16.1	16.1	11.6	17.2	23.6	24.1	16.1	8.4	9.3	9.5	10.5	8.0	7.7	5.5	2.1	1.0	1.2	1.5	63.0	72.9	73.0	59.3
Tennessee	29.1	25.3	21.3	18.9	2.7	4.5	3.8	2.3	13.3	15.3	13.6	9.6	16.0	19.8	17.4	11.9	8.9	9.4	9.2	7.7	7.7	7.0	6.5	1.9	0.8	1.1	0.6	55.9	63.0	56.0	45.6
Alabama	35.5	30.3	27.8	23.1	1.8	1.5	1.5	1.2	11.2	14.2	12.8	9.7	13.0	15.7	14.3	10.9	7.1	9.2	9.0	7.7	6.6	5.9	3.8	1.0	0.3	1.0	0.6	56.6	62.1	58.0	46.1
Mississippi	34.6	30.9	31.2	26.2	7.1	10.4	8.3	8.9	12.9	18.7	15.9	14.4	20.0	29.1	24.2	23.3	8.0	9.3	8.9	9.3	7.4	5.0	5.5	2.2	0.9	1.0	1.0	64.8	77.6	70.3	65.3
West South Central:																														
Arkansas	42.6	38.2	34.1	25.4	2.9	3.0	5.8	4.8	17.8	19.9	15.1	16.0	20.7	22.9	20.9	20.8	8.1	7.4	8.3	7.7	3.5	3.6	3.8	1.7	0.6	1.4	1.2	73.1	72.6	68.3	58.9
Louisiana	31.6	29.4	29.0	29.5	5.3	4.8	5.3	6.0	17.5	16.1	18.4	14.0	22.8	20.9	23.7	20.0	9.5	9.1	10.5	11.4	9.0	8.8	5.9	2.2	0.9	1.5	1.0	66.1	69.3	73.5	67.8
Oklahoma	33.7	29.0	25.0	25.0	6.6	8.2	7.2	3.2	24.1	24.2	21.8	14.3	30.7	32.4	29.0	17.5	4.5	5.5	4.9	4.7	4.1	4.9	3.0	2.9	0.9	1.3	1.4	71.8	71.9	65.1	51.6
Texas	32.4	29.4	26.3	24.8	1.6	1.8	1.4	1.8	9.3	10.5	9.5	8.5	10.9	12.3	10.9	10.3	6.5	8.7	8.3	7.1	3.8	3.0	3.3	2.0	0.6	1.0	0.8	51.8	54.8	49.5	46.3
Mountain:																														
Montana	30.1	35.2	45.5	49.8	10.1	13.0	15.5	18.1	60.8	56.0	40.9	21.1	70.9	69.0	56.4	39.2	4.7	5.7	5.1	7.0	5.2	5.0	5.5	2.8	2.5	2.0	2.6	108.5	117.6	114.0	104.1
Idaho	27.7	26.5	34.5	29.0	7.8	8.1	14.5	10.7	39.6	32.6	28.5	20.9	47.4	40.7	43.0	31.6	5.6	5.1	7.0	5.8	3.2	4.9	4.0	2.6	2.3	2.3	0.7	83.3	77.8	91.7	71.1
Wyoming	28.2	32.2	38.4	34.3	14.5	13.7	12.9	9.0	27.9	25.6	19.3	17.8	42.4	39.3	32.2	26.8	3.2	6.0	6.1	6.3	4.3	3.5	3.5	3.4	3.0	1.8	1.4	77.2	84.8	82.0	72.3
Colorado	33.9	35.7	30.0	37.6	13.7	10.2	12.0	12.0	43.3	36.3	26.1	21.6	57.0	46.5	38.1	33.6	5.8	6.8	5.9	7.3	5.3	2.8	4.8	3.9	1.6	2.0	1.7	100.6	95.9	78.8	85.0
New Mexico	49.2	50.1	35.9	35.9	4.1	5.4	5.4	6.0	33.7	30.3	20.6	12.4	37.8	35.7	26.0	18.4	4.6	5.6	4.6	4.6	3.9	2.9	2.2	6.4	3.9	2.2	0.8	98.0	99.2	71.6	61.9
Arizona	26.9	30.0	39.3	34.4	5.8	5.5	5.1	3.0	48.1	40.3	38.7	20.4	53.9	45.8	43.8	23.4	3.9	5.8	5.4	3.8	3.8	2.4	2.0	5.8	3.2	1.4	1.0	90.5	88.6	92.3	64.6
Utah	23.0	22.0	23.0	18.2	10.9	9.5	13.9	7.0	12.5	16.0	13.8	9.5	23.4	25.5	27.7	16.5	4.9	5.0	4.5	4.4	4.1	3.1	4.1	1.1	1.4	0.8	0.3	52.4	58.0	59.1	43.5
Nevada	20.8	23.8	21.7	25.7	0.0	2.0	1.4	1.0	30.9	24.6	18.3	9.8	30.9	26.6	19.7	10.8	4.1	3.5	5.2	5.0	3.0	4.0	3.0	3.7	1.0	1.7	2.0	59.5	57.9	52.3	46.5
Pacific:																														
Washington	34.8	35.7	35.5	29.7	7.5	8.7	8.0	5.3	21.0	20.3	15.3	13.9	28.5	29.0	23.3	19.2	6.4	7.4	7.0	5.9	4.2	3.8	3.3	2.5	1.5	1.6	2.1	72.2	77.8	71.2	60.2
Oregon	29.7	34.1	37.4	31.0	3.5	5.2	6.0	5.2	17.2	16.0	17.9	10.0	20.7	21.2	23.9	15.2	6.5	7.9	7.4	5.8	5.6	5.6	3.4	3.0	1.3	1.8	0.8	59.9	70.1	76.1	56.2
California	38.5	37.5	32.3	26.4	2.1	2.0	1.5	2.7	14.2	13.0	15.0	15.0	16.3	15.0	16.5	17.7	5.9	6.3	7.1	7.2	3.3	4.2	4.0	3.9	1.4	1.2	1.4	64.6	63.5	61.3	56.7

Bureau of Agricultural Economics. Based upon returns from crop reporters. Revised figures. Supersedes Table 537, 1928 Yearbook.

[1] Including contracts to purchase (but not options).
[2] Including loss of title by default of contract, sales to avoid foreclosure, and surrender of title or other transfers to avoid foreclosure.
[3] Including all other sales in settlement of estates.
[4] Excluding administrators' and executors' sales in 1926.

TABLE 542.—*Bankruptcies among farmers and per cent the farmer cases are of all bankruptcies, years ended June 30, 1925–1929*

Geographic division and State	1925			1926			1927			1928			1929		
	Total	Farmers: Number	Farmers: Per cent of all cases	Total	Farmers: Number	Farmers: Per cent of all cases	Total	Farmers: Number	Farmers: Per cent of all cases	Total	Farmers: Number	Farmers: Per cent of all cases	Total	Farmers: Number	Farmers: Per cent of all cases
United States	44, 236	7, 872	17. 8	47, 049	7, 769	16. 5	48, 066	6, 296	13. 1	53, 444	5, 679	10. 6	56, 897	4, 939	8. 7
New England	3, 272	169	5. 2	3, 165	145	4. 6	3, 412	105	3. 1	4, 666	162	3. 5	4, 577	145	3. 2
Maine	871	103	11. 8	853	101	11. 8	810	51	6. 3	837	77	9. 2	832	69	8. 3
New Hampshire	86	5	5. 8	108	7	6. 5	105	7	6. 7	110	7	6. 4	135	6	4. 4
Vermont	205	39	19. 0	197	17	8. 6	125	21	16. 8	195	29	14. 9	211	28	13. 3
Massachusetts	1, 378	7	. 5	1, 438	12	. 8	1, 646	10	. 6	2, 468	18	. 7	2, 550	26	1. 0
Rhode Island	132	2	1. 5	111	0	. 0	195	2	1. 0	208	0	. 0	179	2	1. 1
Connecticut	600	13	2. 2	458	8	1. 7	531	14	2. 6	848	31	3. 7	670	14	2. 1
Middle Atlantic	7, 348	190	2. 6	6, 508	224	3. 4	7, 189	224	3. 1	7, 878	274	3. 5	8, 382	270	3. 2
New York	5, 376	104	1. 9	4, 410	122	2. 8	4, 758	145	3. 0	5, 548	152	2. 7	5, 484	149	2. 7
New Jersey	719	16	2. 2	802	33	4. 1	846	16	1. 9	576	12	2. 1	1, 041	18	1. 7
Pennsylvania	1, 253	70	5. 6	1, 296	69	5. 3	1, 585	63	4. 0	1, 754	110	6. 3	1, 857	103	5. 5
East North Central	5, 692	760	13. 4	7, 470	844	11. 3	7, 842	719	9. 2	9, 354	874	9. 3	11, 122	980	8. 8
Ohio	1, 813	214	11. 8	2, 171	188	8. 7	2, 396	137	5. 7	2, 802	157	5. 6	3, 414	220	6. 4
Indiana	360	97	26. 9	471	112	23. 8	413	76	18. 4	547	114	20. 9	691	110	15. 9
Illinois	1, 596	190	11. 9	2, 590	234	9. 0	2, 943	257	8. 7	3, 143	374	11. 9	3, 778	410	10. 9
Michigan	868	46	5. 3	930	50	5. 4	818	34	4. 2	1, 192	41	3. 4	1, 536	36	2. 3
Wisconsin	1, 055	213	20. 2	1, 308	260	19. 9	1, 272	215	16. 9	1, 670	188	11. 3	1, 703	204	12. 0
West North Central	7, 363	2, 889	39. 2	7, 953	2, 813	35. 4	7, 944	2, 404	30. 3	7, 149	1, 729	24. 2	6. 942	1, 471	21. 2
Minnesota	1, 586	369	23. 3	1, 962	419	21. 4	1, 840	294	16. 0	2, 104	266	12. 6	2, 010	193	9. 6
Iowa	1, 707	861	50. 4	1, 759	791	45. 0	1, 593	656	41. 2	1, 297	534	41. 2	1, 109	420	37. 9
Missouri	1, 482	287	19. 4	1, 530	301	19. 7	1, 614	314	19. 5	1, 741	288	16. 5	1, 771	211	11. 9
North Dakota	837	629	75. 1	773	536	69. 3	567	376	66. 3	258	153	59. 3	452	287	63. 5
South Dakota	556	352	63. 3	623	368	59. 1	626	352	56. 2	478	239	50. 0	250	106	42. 4
Nebraska	525	178	33. 9	658	238	36. 2	689	181	26. 3	578	135	23. 4	684	157	23. 0
Kansas	670	213	31. 8	648	160	24. 7	1, 015	231	22. 8	693	114	16. 5	666	97	14. 6
South Atlantic	5, 884	1, 037	17. 6	5, 889	747	12. 7	5, 874	585	10. 0	6, 895	685	9. 9	7, 254	510	7. 0
Delaware	40	8	20. 0	44	5	11. 4	30	4	13. 3	35	10	28. 6	32	8	25. 0
Maryland	175	38	21. 7	315	54	17. 1	267	35	13. 1	317	49	15. 5	375	48	12. 8
District of Columbia	83	0	. 0	112	0	. 0	131	0	. 0	147	1	. 7	169	-----	----
Virginia	1, 407	95	6. 8	1, 689	111	6. 6	1, 844	97	5. 3	1, 976	109	5. 5	2, 193	98	4. 5
West Virginia	414	19	4. 6	482	10	2. 1	657	16	2. 4	794	25	3. 1	976	41	4. 2
North Carolina	308	45	14. 6	319	37	11. 6	389	50	12. 9	377	38	10. 1	317	25	7. 9
South Carolina	230	26	11. 3	275	53	19. 3	280	47	16. 8	289	46	15. 9	239	34	14. 2
Georgia	3, 041	798	26. 2	2, 502	467	18. 7	1, 973	327	16. 6	2, 380	394	16. 6	2, 319	248	10. 7
Florida	186	8	4. 3	151	10	6. 6	303	9	3. 0	580	13	2. 2	634	13	2. 1
East South Central	5, 316	517	9. 7	6, 119	579	9. 5	6, 364	615	9. 7	7, 562	521	6. 9	7, 825	352	4. 5
Kentucky	682	108	15. 8	1, 027	117	11. 4	1, 209	164	13. 6	1, 748	191	10. 9	1, 860	131	7. 0
Tennessee	1, 844	109	5. 9	2, 052	134	6. 5	2, 132	101	4. 7	2, 376	102	4. 3	2, 964	118	4. 0
Alabama	2, 248	242	10. 8	2, 670	295	11. 0	2, 600	318	12. 2	2, 622	211	8. 0	2, 637	85	3. 2
Mississippi	542	58	10. 7	370	33	8. 9	423	32	7. 6	816	17	2. 1	364	18	4. 9
West South Central	2, 750	650	23. 6	2, 979	764	25. 6	2, 741	567	20. 7	2, 870	561	19. 5	2, 805	484	17. 3
Arkansas	338	85	25. 1	448	101	22. 5	416	94	22. 6	379	89	23. 5	484	83	17. 1
Louisiana	362	77	21. 3	473	159	33. 6	471	119	25. 3	481	93	19. 3	531	85	16. 0
Oklahoma	921	145	15. 7	844	170	20. 1	782	145	18. 5	820	108	13. 2	740	65	8. 8
Texas	1, 129	343	30. 4	1, 214	334	27. 5	1, 072	209	19. 5	1, 190	271	22. 8	1, 050	251	23. 9
Mountain	2, 563	1, 071	41. 8	2, 677	1, 142	42. 7	1, 915	609	31. 8	1, 747	420	24. 0	1, 601	335	20. 9
Montana	703	460	65. 4	1, 052	624	59. 3	536	245	45. 7	346	126	36. 4	379	131	34. 6
Idaho	468	260	55. 6	433	223	51. 5	337	161	47. 8	284	101	35. 6	260	78	30. 0
Wyoming	143	48	33. 6	117	38	32. 5	114	31	27. 2	148	44	29. 7	68	17	25. 0
Colorado	686	220	32. 1	479	143	29. 9	400	90	22. 5	387	63	16. 3	426	50	11. 7
New Mexico	95	27	28. 4	141	50	35. 5	67	22	32. 8	98	27	27. 6	84	26	31. 0
Arizona	62	19	30. 6	84	29	34. 5	114	30	26. 3	86	23	26. 7	63	7	11. 1
Utah	382	32	8. 4	358	33	9. 2	325	26	8. 0	380	34	8. 9	297	25	8. 4
Nevada	24	5	20. 8	13	2	15. 4	22	4	18. 2	18	2	11. 1	24	1	4. 2
Pacific	4, 048	589	14. 6	4, 289	511	11. 9	4, 785	468	10. 0	5, 323	453	8. 5	6, 389	387	6. 1
Washington	824	196	23. 8	951	182	19. 1	1, 097	160	14. 6	1, 143	144	12. 6	1, 451	107	7. 4
Oregon	928	100	10. 8	1, 085	109	10. 0	1, 044	72	6. 9	1, 213	67	5. 5	1, 277	83	6. 5
California	2, 296	293	12. 8	2, 253	220	9. 8	2, 644	236	8. 9	2, 967	242	8. 2	3, 661	197	5. 4

Bureau of Agricultural Economics. Compiled from annual reports of the Attorney General.

TABLE 543.—*Bankruptcies among farmers, by geographic divisions, for fiscal years 1910–1929*

[Year ending June 30]

Year	United States		New England		Middle Atlantic		East North Central		West North Central	
	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies
1910	849	5.7	123	6.0	52	1.8	98	3.2	287	15.9
1911	679	4.8	85	4.4	48	1.6	89	3.4	167	11.0
1912	837	5.4	148	7.4	58	1.7	78	2.7	219	14.2
1913	942	5.4	81	4.0	66	1.8	143	5.0	258	13.7
1914	1,045	5.6	88	4.0	63	2.0	91	2.8	289	14.6
1915	1,246	5.9	112	4.8	90	2.4	94	2.8	290	13.8
1916	1,658	6.9	143	5.3	88	2.0	146	3.9	276	12.6
1917	1,906	7.5	152	4.8	130	2.7	142	3.6	325	13.6
1918	1,632	7.0	125	4.3	97	2.4	126	3.6	267	11.4
1919	1,207	6.3	104	4.1	89	2.4	75	2.2	156	8.1
1920	997	6.4	72	3.8	67	2.2	83	3.3	213	12.0
1921	1,363	9.0	91	6.2	91	3.3	62	3.6	324	20.6
1922	3,236	14.4	92	4.9	77	2.6	247	9.0	1,066	40.3
1923	5,940	17.4	146	4.9	148	3.1	569	11.5	2,005	46.1
1924	7,772	18.7	196	5.8	171	3.2	684	12.2	2,785	42.5
1925	7,872	17.8	169	5.2	190	2.6	760	13.4	2,889	39.2
1926	7,769	16.5	145	4.6	224	3.4	844	11.3	2,813	35.4
1927	6,296	13.1	105	3.1	224	3.1	719	9.2	2,404	30.3
1928	5,679	10.6	162	3.5	274	3.5	874	9.3	1,729	24.2
1929	4,939	8.7	145	3.2	270	3.2	980	8.8	1,471	21.2

Year	South Atlantic		East South Central		West South Central		Mountain		Pacific	
	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies	Number	Per cent of total bankruptcies
1910	63	4.5	38	2.8	66	8.3	35	7.1	87	9.0
1911	78	5.1	65	5.3	72	8.2	35	7.0	40	4.2
1912	79	4.7	91	5.7	62	7.0	55	9.1	47	4.6
1913	85	4.5	83	4.1	89	7.4	66	8.9	71	5.4
1914	100	4.5	100	4.2	81	6.8	118	15.7	115	6.9
1915	177	5.5	127	4.4	97	9.3	159	19.2	100	5.9
1916	369	9.8	164	6.8	178	9.4	179	17.0	115	6.1
1917	407	12.2	184	6.8	217	12.2	193	17.4	156	7.3
1918	410	13.8	179	5.3	186	15.1	105	11.4	137	6.7
1919	291	15.8	126	5.6	164	14.9	102	11.9	100	5.8
1920	169	10.1	108	6.8	95	10.0	104	16.2	86	5.9
1921	297	13.7	100	3.9	124	15.7	177	23.8	97	7.2
1922	678	17.0	201	4.9	264	19.5	419	38.2	192	11.0
1923	959	17.0	420	9.1	539	20.4	730	43.3	424	16.3
1924	1,085	16.9	483	9.7	788	22.3	1,040	46.3	540	15.7
1925	1,037	17.6	517	9.7	650	23.6	1,071	41.8	589	14.6
1926	747	12.7	579	9.5	764	25.6	1,142	42.7	511	11.9
1927	585	10.0	615	9.7	567	20.7	609	31.8	468	10.0
1928	685	9.9	521	6.9	561	19.5	420	24.0	453	8.5
1929	510	7.0	352	4.5	484	17.3	335	20.9	387	6.1

Bureau of Agricultural Economics. Compiled from Annual Reports of the Attorney General.

TABLE 544.—*Farm tenancy by States: Relative importance of tenant farming compared with all farming, percentages based on census data, 1880–1925*

Geographic division and State	Percentage of all farms operated by tenants, 1880–1925 [1]						Percentage of farms of designated size operated by tenants, 1925 [1]				Percentage of farm land rented, 1900–1925 [2]				Land operated by tenants, 1925 [1]				Crop production on tenant farms, 1924 [1 4]					Livestock on tenant farms, Jan. 1, 1925 [1]			
	1880	1890	1900	1910	1920	1925	Under 50 acres	50–99 acres	100–499 acres	500 acres and over	1900	1910	1920 [3]	1925	All land in farms	Land in harvested crops	Land not in harvested crops: Total	Land not in harvested crops: Pasture	Wheat	Corn	Oats	Cotton	Tobacco	Horses and mules	Beef cattle	Dairy cattle	Hogs
	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.	P.ct.
United States	26	28	35	37	38	39	49	31	34	23	31	33	37	39	29	41	22	20	38	46	42	67	48	35	24	29	36
New England	9	9	9	8	7	6	5	5	6	5	11	10	10	7	6	6	6	6	7	6	7	-----	7	6	4	8	5
Middle Atlantic	19	22	25	22	21	16	10	15	22	14	31	29	27	21	19	21	17	17	32	29	22	-----	50	20	20	20	23
East North Central	20	23	26	27	28	26	15	22	35	30	32	36	38	37	32	37	26	26	41	48	41	64	39	33	31	26	37
West North Central	21	24	30	31	34	38	30	32	42	29	35	38	44	48	36	41	30	29	40	47	45	81	51	38	32	34	37
South Atlantic	36	38	44	46	47	44	56	35	27	18	32	33	34	32	30	46	23	19	36	41	20	66	53	37	16	32	34
East South Central	37	38	48	51	50	50	70	29	20	15	29	31	31	31	29	49	19	19	27	44	23	72	48	37	20	35	35
West South Central	35	39	49	53	53	59	75	54	45	25	29	33	38	42	34	55	24	23	40	51	46	66	11	47	23	41	38
Mountain	7	7	12	11	15	22	18	29	26	16	22	20	30	40	15	25	13	12	26	31	28	43	-----	19	10	24	24
Pacific	17	15	20	17	20	16	11	19	23	26	30	32	36	34	20	27	18	15	37	39	29	42	-----	23	11	30	22
New England:																											
Maine	4	5	5	4	4	3	4	3	3	2	5	5	5	4	3	3	3	3	-----	-----	3	-----	-----	3	3	2	3
New Hampshire	8	8	7	7	7	5	5	5	5	3	8	7	8	6	4	4	4	4	-----	-----	-----	-----	-----	5	4	4	5
Vermont	13	15	15	12	12	9	6	7	11	9	18	16	15	12	11	13	10	11	-----	-----	16	-----	-----	11	10	13	11
Massachusetts	8	9	10	8	7	5	5	4	4	5	10	9	9	6	4	4	6	4	-----	-----	-----	-----	4	4	4	4	4
Rhode Island	20	19	20	18	16	12	11	12	14	10	22	21	19	15	12	12	9	13	-----	-----	-----	-----	-----	12	7	16	13
Connecticut	10	12	13	10	8	6	6	5	7	7	15	12	12	9	7	6	7	7	-----	-----	-----	-----	8	7	4	7	4
Middle Atlantic:																											
New York	17	20	24	21	19	14	8	12	19	14	31	29	26	20	17	19	16	17	26	18	20	-----	30	17	16	18	19
New Jersey	25	27	30	25	23	16	8	19	30	14	35	32	30	24	23	25	22	27	32	29	-----	-----	-----	23	16	27	23
Pennsylvania	21	23	26	23	22	17	12	17	24	15	32	30	27	22	21	24	18	17	34	31	23	-----	51	23	21	22	25
East North Central:																											
Ohio	19	23	27	28	29	25	14	25	35	31	33	37	38	35	31	35	27	26	38	39	39	-----	44	32	25	29	38
Indiana	24	25	29	30	32	29	18	27	38	37	35	40	43	42	35	39	30	30	41	41	47	-----	39	35	32	31	37
Illinois	31	34	39	41	43	42	24	35	50	35	45	51	54	55	47	51	39	39	55	56	58	-----	-----	47	39	45	45
Michigan	10	14	16	16	18	15	10	15	20	17	22	24	26	23	18	19	16	17	21	22	21	-----	-----	18	16	17	23
Wisconsin	9	11	14	14	14	15	10	12	20	21	17	19	20	21	18	20	17	18	15	26	21	-----	34	18	20	18	23

West North Central:																											
Minnesota	9	13	17	21	25	27	12	18	33	33	25	33	36	40	32	36	26	27	32	43	40	-----	-----	33	36	27	35
Iowa	24	28	35	38	42	45	25	39	49	33	40	45	50	53	47	50	43	41	47	52	52	-----	-----	47	41	45	43
Missouri	27	27	31	30	29	33	41	31	29	24	28	31	33	35	29	34	26	24	35	37	34	81	57	30	20	26	27
North Dakota	2	7	8	14	26	34	33	40	38	26	20	31	42	50	31	33	28	25	32	34	35	-----	-----	31	25	30	30
South Dakota	4	13	22	25	35	42	33	44	47	24	40	40	49	53	32	41	24	22	41	48	48	-----	-----	36	30	39	38
Nebraska	18	25	37	38	43	46	28	46	50	33	41	38	44	49	37	45	31	29	49	49	47	-----	-----	43	32	43	39
Kansas	16	28	35	37	40	42	28	38	47	33	42	43	50	54	39	44	35	33	45	44	43	-----	-----	41	32	39	34
South Atlantic:																											
Delaware	42	47	50	42	39	36	23	32	53	50	60	53	51	47	46	49	44	52	63	46	-----	-----	-----	46	39	50	43
Maryland	31	31	34	29	29	26	17	23	40	35	43	11	38	37	36	39	33	34	48	39	-----	-----	48	36	25	35	35
Virginia	30	27	31	26	26	25	31	19	20	18	29	24	24	22	20	25	18	14	23	27	-----	46	43	20	12	17	22
West Virginia	19	18	22	21	16	16	21	13	14	15	18	19	17	17	14	15	14	12	29	19	12	-----	25	14	9	16	17
North Carolina	33	34	41	42	44	45	58	30	26	23	30	31	33	34	31	46	25	20	25	40	-----	62	60	38	18	28	35
South Carolina	50	55	61	63	64	65	78	47	30	18	38	38	44	43	41	60	28	26	46	54	-----	70	59	52	34	49	45
Georgia	45	54	60	66	67	64	80	59	38	19	39	43	47	43	42	59	32	31	46	56	-----	68	50	53	29	46	43
Florida	31	24	27	27	25	21	24	22	11	7	17	16	15	12	11	23	7	5	-----	28	-----	48	13	19	8	15	16
East South Central:																											
Kentucky	26	25	33	34	33	32	50	17	17	17	22	23	23	22	20	31	16	15	23	36	-----	-----	49	24	16	22	23
Tennessee	35	31	41	41	41	41	58	25	20	16	29	29	31	29	27	41	19	19	29	43	-----	67	44	31	19	30	29
Alabama	47	49	58	60	58	61	77	46	26	16	35	36	38	41	38	60	24	25	-----	53	-----	65	-----	49	34	46	46
Mississippi	44	53	62	66	66	68	87	35	18	11	33	35	36	36	34	63	19	20	-----	53	-----	78	-----	52	30	41	46
West South Central:																											
Arkansas	31	32	45	50	51	57	77	34	22	18	32	30	33	36	34	51	22	24	-----	45	-----	69	-----	43	28	35	34
Louisiana	35	44	58	55	57	60	75	31	19	13	27	28	31	32	30	52	15	14	-----	44	-----	72	-----	42	24	33	37
Oklahoma	-----	1	44	55	51	59	69	64	53	23	43	52	49	54	45	52	39	36	40	56	48	67	-----	49	33	47	41
Texas	38	42	50	53	53	60	76	61	48	27	26	29	36	40	31	59	21	20	41	52	45	64	-----	48	20	42	38
Mountain:																											
Montana	5	5	9	9	11	22	19	27	24	19	15	25	27	40	17	22	15	14	25	-----	24	-----	-----	19	12	26	23
Idaho	5	5	9	10	16	24	20	32	25	16	13	18	25	36	20	26	18	15	29	-----	27	-----	-----	23	9	24	25
Wyoming	3	4	8	8	12	18	19	26	24	11	26	16	28	43	9	18	8	8	25	24	29	-----	-----	13	8	22	20
Colorado	13	11	23	18	23	31	22	41	36	21	35	26	35	42	23	34	19	18	35	36	42	-----	-----	30	16	32	29
New Mexico	8	5	9	5	12	17	17	26	19	12	18	17	36	43	12	23	11	12	16	22	-----	52	----	13	9	22	18
Arizona	13	8	8	9	18	22	24	29	19	10	7	16	34	40	9	26	8	8	-----	-----	-----	38	-----	9	6	24	17
Utah	5	5	9	8	11	11	12	13	10	6	23	12	16	17	7	12	6	5	10	-----	12	-----	-----	10	5	9	12
Nevada	10	8	11	12	9	8	7	11	8	6	14	9	15	19	5	6	5	5	-----	-----	-----	-----	-----	6	4	11	11
Pacific:																											
Washington	7	8	14	14	19	16	11	18	24	33	28	32	41	43	25	32	23	18	40	-----	32	-----	-----	28	15	22	26
Oregon	14	13	18	15	19	17	12	17	21	21	26	28	30	30	17	26	15	12	35	----	26	-----	-----	20	10	22	22
California	20	18	23	21	21	15	10	20	24	24	32	34	36	32	19	25	17	15	32	----	34	42	-----	21	11	37	20

Bureau of Agricultural Economics.

[1] Tenants owning none of the land in their farms.
[2] Land in tenant farms plus rented land in part owner farms.
[3] Rented land in part-owner farms for 1900 and 1920 on basis of succeeding censuses.
[4] Percentages omitted for States which produced less than one-tenth of 1 per cent (0.001) of the United States crop.

TABLE 545.—*Farm mortgage debt: Total and by tenure of land, January 1, 1925, and January 1, 1928*

Geographic division and State	Total mortgage debt		Debt on owner-operated land		Debt on tenant-operated land		Debt on manager-operated land	
	1925	1928	1925	1928	1925	1928	1925	1928
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
United States	9, 360, 620	9, 468, 526	5, 504, 437	5, 560, 017	3, 612, 193	3, 644, 009	243, 990	264, 500
New England	123, 748	122, 494	113, 830	112, 315	7, 579	8, 227	2, 339	1, 952
Maine	26, 097	25, 252	25, 207	24, 323	743	806	147	123
New Hampshire	7, 732	7, 780	7, 357	7, 393	296	321	79	66
Vermont	28, 001	28, 322	24, 933	25, 050	2, 834	3, 077	234	195
Massachusetts	32, 207	31, 262	29, 595	28, 696	1, 538	1, 670	1, 074	896
Rhode Island	2, 435	2, 455	2, 082	2, 092	273	296	80	67
Connecticut	27, 276	27, 423	24, 656	24, 761	1, 895	2, 057	725	605
Middle Atlantic	388, 798	376, 614	301, 777	291, 570	73, 884	72, 510	13, 137	12, 534
New York	226, 776	219, 812	177, 110	171, 302	41, 153	40, 388	8, 513	8, 122
New Jersey	41, 741	40, 370	33, 116	31, 945	7, 167	7, 034	1, 458	1, 391
Pennsylvania	120, 281	116, 432	91, 551	88, 323	25, 564	25, 088	3, 166	3, 021
East North Central	1, 861, 887	1, 950, 126	1, 177, 682	1, 220, 276	632, 908	678, 957	51, 297	50, 893
Ohio	214, 409	222, 101	152, 979	151, 821	54, 146	63, 053	7, 284	7, 227
Indiana	264, 483	277, 269	148, 383	152, 664	109, 175	117, 734	6, 925	6, 871
Illinois	650, 353	685, 365	293, 047	312, 372	338, 839	354, 672	18, 467	18, 321
Michigan	228, 089	235, 399	169, 263	174, 783	50, 670	52, 524	8, 156	8, 092
Wisconsin	504, 553	529, 992	414, 010	428, 636	80, 078	90, 974	10, 465	10, 382
West North Central	4, 126, 402	4, 056, 187	2, 199, 924	2, 178, 998	1, 883, 767	1, 836, 779	42, 711	40, 410
Minnesota	553, 784	558, 458	326, 561	334, 925	222, 930	219, 472	4, 293	4, 061
Iowa	1, 424, 352	1, 402, 178	765, 475	764, 415	642, 254	622, 035	16, 623	15, 728
Missouri	449, 022	447, 351	268, 564	272, 753	174, 867	169, 308	5, 591	5, 290
North Dakota	226, 714	230, 250	134, 326	136, 570	89, 996	91, 417	2, 392	2, 263
South Dakota	372, 004	370, 946	177, 858	175, 541	190, 695	192, 140	3, 451	3, 265
Nebraska	617, 930	599, 418	320, 628	303, 437	291, 263	290, 267	6, 039	5, 714
Kansas	482, 596	447, 586	206, 512	191, 357	271, 762	252, 140	4, 322	4, 089
South Atlantic	439, 609	491, 896	262, 550	280, 163	149, 992	178, 573	27, 067	33, 160
Delaware	8, 695	9, 469	4, 356	4, 283	3, 754	4, 469	585	717
Maryland	50, 422	54, 980	30, 141	30, 656	15, 085	17, 959	5, 196	6, 365
District of Columbia	304	354	82	83	30	36	192	235
Virginia	79, 709	87, 117	59, 114	62, 439	15, 974	19, 017	4, 621	5, 661
West Virginia	18, 570	20, 155	14, 582	15, 377	3, 105	3, 696	883	1, 082
North Carolina	78, 606	90, 866	47, 427	53, 699	29, 821	35, 503	1, 358	1, 664
South Carolina	68, 735	77, 214	34, 416	36, 286	32, 287	38, 439	2, 032	2, 489
Georgia	109, 060	123, 305	53, 826	57, 299	48, 189	57, 374	7, 045	8, 632
Florida	25, 508	28, 436	18, 606	20, 041	1, 747	2, 080	5, 155	6, 315
East South Central	356, 378	381, 497	218, 752	239, 725	131, 955	135, 132	5, 671	6, 640
Kentucky	94, 549	103, 798	71, 006	79, 583	22, 828	23, 378	715	837
Tennessee	85, 857	96, 711	59, 274	69, 382	25, 863	26, 486	720	843
Alabama	66, 410	69, 488	36, 365	38, 571	29, 030	29, 729	1, 015	1, 188
Mississippi	109, 562	111, 500	52, 107	52, 189	54, 234	55, 539	3, 221	3, 772
West South Central	860, 269	901, 252	415, 684	453, 965	421, 607	420, 460	22, 978	26, 827
Arkansas	97, 809	103, 464	51, 726	56, 982	43, 004	42, 887	3, 079	3, 595
Louisiana	57, 910	61, 760	33, 062	36, 337	21, 080	21, 023	3, 768	4, 400
Oklahoma	218, 963	228, 513	99, 366	108, 835	117, 207	116, 888	2, 390	2, 790
Texas	485, 587	507, 515	231, 530	251, 811	240, 316	239, 662	13, 741	16, 042
Mountain	533, 787	496, 551	319, 965	294, 116	199, 456	185, 946	14, 366	16, 489
Montana	116, 616	104, 862	69, 654	60, 588	44, 678	41, 652	2, 284	2, 622
Idaho	107, 355	100, 033	67, 479	62, 517	38, 296	35, 702	1, 580	1, 814
Wyoming	43, 364	40, 922	25, 016	23, 518	16, 954	15, 805	1, 394	1, 599
Colorado	153, 727	144, 464	82, 209	77, 078	68, 214	63, 594	3, 304	3, 792
New Mexico	28, 784	26, 900	16, 754	15, 388	10, 651	9, 929	1, 379	1, 583
Arizona	29, 545	29, 006	16, 396	16, 175	10, 491	9, 781	2, 658	3, 050
Utah	39, 152	36, 367	31, 086	28, 785	7, 779	7, 252	287	330
Nevada	15, 244	13, 997	11, 371	10, 067	2, 393	2, 231	1, 480	1, 699
Pacific	669, 742	691, 909	494, 273	388, 889	111, 045	127, 425	64, 424	75, 595
Washington	121, 371	120, 523	91, 912	86, 609	25, 207	28, 925	4, 252	4, 989
Oregon	105, 503	110, 875	82, 036	83, 856	19, 988	22, 937	3, 479	4, 082
California	442, 868	460, 511	320, 325	318, 424	65, 850	75, 563	56, 693	66, 524

Bureau of Agricultural Economics. Estimates by Division of Agricultural Finance.

TABLE 546.—*Rural and farm population, percentage of total population gainfully employed in agriculture, and percentage of total*

Census year	Percentage of population			Percentage gainfully employed in agriculture
	"Rural" outside of places 8,000 or more	"Rural" outside of places 2,500 or more	On farms	
1820	95.1			83.1
1830	93.3			
1840	91.5			77.5
1850	87.5			
1860	83.9			
1870	79.1			47.5
1880	77.4	70.5		44.3
1890	71.0	63.9		39.2
1900	67.1	60.0		35.7
1910	61.3	54.2	34.7	33.2
1920	56.2	48.6	29.5	26.3
1925			25.3	

Bureau of Agricultural Economics. Compiled from reports of Bureau of the Census.

TABLE 547.—*Estimated farm population* [1] *of the United States, 1910, 1920–1929, by years*

Year	Number	Year	Number
1910	31, 400, 000	1925 (Census of 1925)	28, 981, 668
1920	31, 000, 000	1926	28, 502, 000
1921	30, 600, 000	1927	27, 853, 000
1922	30, 200, 000	1928	27, 699, 000
1923	29, 800, 000	1929	27, 511, 000
1924	29, 400, 000		

Bureau of the Census.

[1] Farm population, as here used, is in accord with the definition in the 1925 Census of Agriculture—namely, "all persons living on farms."

TABLE 548.—*Changes in farm population and land utilization, United States, census years 1850–1925*

Item	Unit	1850	1860	1870	1880	1890	1900	1910	1920	1925
Number of farms	Thousands	1, 449	2, 044	2, 660	4, 009	4, 565	5, 737	6, 362	6, 448	6, 372
Farm population	do							32, 077	31, 614	28, 982
Do	Number per farm.							5.0	4.9	4.5
Land in farms	1,000 acres	293, 561	407, 213	407, 735	536, 082	623, 219	838, 592	878, 798	955, 884	924, 319
Improved land in farms	do	113, 033	163, 111	188, 921	284, 771	357, 617	414, 498	478, 452	503, 073	(1)
Farm land per farm	Acres	202.6	199.2	153.3	133.7	136.5	146.2	138.1	148.2	145.1
Improved land per farm	do	78.0	79.8	71.0	71.0	78.3	72.2	75.2	78.0	(1)
Land in harvested crops	1,000 acres				177, 500	232, 500	293, 000	321, 500	358, 000	349, 600
Intertilled crops	do				89, 814	110, 530	143, 727	161, 706	160, 097	152, 300
Small grain crops	do				57, 523	69, 929	92, 408	93, 796	128, 669	103, 900
Hay	do				31, 131	53, 549	59, 284	69, 027	72, 880	93, 341
Pasture	do							291, 440	(1)	407, 936
Forest and woodland	do							190, 866	167, 731	143, 794

Bureau of Agricultural Economics. Based on census data.

[1] Data not available.

TABLE 549.—*Population, United States: Census years, 1870–1920; estimated, 1928*

	1870 [1]	1880 [1]	1890 [1]	1900 [1]	1910 [1]	1920 [1]	1928 [2]
United States	38, 558, 371	50, 155, 783	[3] 62,947,714	75, 994, 575	91, 972, 266	105,710,620	119, 319, 534
Alabama	996, 992	1, 262, 505	1, 513, 401	1, 828, 697	2, 138, 093	2, 348, 174	2, 562, 000
Arizona	9, 658	40, 440	88, 243	122, 931	204, 354	334, 162	468, 000
Arkansas	484, 471	802, 525	1, 128, 211	1, 311, 564	1, 574, 449	1, 752, 204	1, 935, 000
California	560, 247	864, 694	1, 213, 398	1, 485, 053	2, 377, 549	3, 426, 861	4, 501, 000
Colorado	39, 864	194, 327	413, 249	539, 700	799, 024	939, 629	1, 083, 000
Connecticut	537, 454	622, 700	746, 258	908, 420	1, 114, 756	1, 380, 631	1, 653, 000
Delaware	125, 015	146, 608	168, 493	184, 735	202, 322	223, 003	243, 000
District of Columbia	131, 700	177, 624	230, 392	278, 718	331, 069	437, 571	546, 000
Florida	187, 748	269, 493	391, 422	528, 542	752, 619	968, 470	1, 389, 000
Georgia	1, 184, 109	1, 542, 180	1, 837, 353	2, 216, 331	2, 609, 121	2, 895, 832	3, 188, 000
Idaho	14, 999	32, 610	88, 548	161, 772	325, 594	431, 866	541, 000
Illinois	2, 539, 891	3, 077, 871	3, 826, 352	4, 821, 550	5, 638, 591	6, 485, 280	7, 351, 000
Indiana	1, 680, 637	1, 978, 301	2, 192, 404	2, 516, 462	2, 700, 876	2, 930, 390	3, 164, 000
Iowa	1, 194, 020	1, 624, 615	1, 912, 297	2, 231, 853	2, 224, 771	2, 404, 021	2, 427, 000
Kansas	364, 399	996, 096	1, 428, 108	1, 470, 495	1, 690, 949	1, 769, 257	1, 832, 000
Kentucky	1, 321, 011	1, 648, 690	1, 858, 635	2, 147, 174	2, 289, 905	2, 416, 630	2, 546, 000
Louisiana	726, 915	939, 946	1, 118, 588	1, 381, 625	1, 656, 388	1, 798, 509	1, 943, 000
Maine	626, 915	648, 936	661, 086	694, 466	742, 371	768, 014	794, 000
Maryland	780, 894	934, 943	1, 042, 390	1, 188, 044	1, 295, 346	1, 449, 661	1, 608, 000
Massachusetts	1, 457, 351	1, 783, 085	2, 238, 947	2, 805, 346	3, 366, 416	3, 852, 356	4, 269, 000
Michigan	1, 184, 059	1, 636, 937	2, 093, 890	2, 420, 982	2, 810, 173	3, 668, 412	4, 547, 000
Minnesota	439, 706	780, 773	1, 310, 283	1, 751, 394	2, 075, 708	2, 387, 125	2, 706, 000
Mississippi	827, 922	1, 131, 597	1, 289, 600	1, 551, 270	1, 797, 114	1, 790, 618	[4] 1, 790, 618
Missouri	1, 721, 295	2, 168, 380	2, 679, 185	3, 106, 665	3, 293, 335	3, 404, 055	3, 517, 000
Montana	20, 595	39, 159	142, 924	243, 329	376, 053	548, 889	[5] 548, 889
Nebraska	122, 993	452, 402	1, 062, 656	1, 066, 300	1, 192, 214	1, 296, 372	1, 403, 000
Nevada	42, 491	62, 266	47, 355	42, 335	81, 875	77, 407	[4] 77, 407
New Hampshire	318, 300	346, 991	376, 530	411, 588	430, 572	443, 083	455, 000
New Jersey	906, 096	1, 131, 116	1, 444, 933	1, 883, 669	2, 537, 167	3, 155, 900	3, 789, 000
New Mexico	91, 874	119, 565	160, 282	195, 310	327, 301	360, 350	394, 000
New York	4, 382, 759	5, 082, 871	6, 003, 174	7, 268, 894	9, 113, 614	10, 385, 227	11, 493, 000
North Carolina	1, 071, 361	1, 399, 750	1, 617, 949	1, 893, 810	2, 206, 287	2, 559, 123	2, 920, 000
North Dakota	2, 405	36, 909	190, 983	319, 146	577, 056	646, 872	[6] 641, 192
Ohio	2, 665, 260	3, 198, 062	3, 672, 329	4, 157, 545	4, 767, 121	5, 759, 394	6, 774, 000
Oklahoma			[7] 258, 657	[7] 790, 391	1, 657, 155	2, 028, 283	2, 407, 000
Oregon	90, 923	174, 768	317, 704	413, 536	672, 765	783, 389	896, 000
Pennsylvania	3, 521, 951	4, 282, 891	5, 258, 113	6, 302, 115	7, 665, 111	8, 720, 017	9, 798, 000
Rhode Island	217, 353	276, 531	345, 506	428, 556	542, 610	604, 397	711, 000
South Carolina	705, 606	995, 577	1, 151, 149	1, 340, 316	1, 515, 400	1, 683, 724	1, 855, 000
South Dakota	11, 776	98, 268	348, 600	401, 570	583, 888	636, 547	701, 000
Tennessee	1, 258, 520	1, 542, 359	1, 767, 518	2, 020, 616	2, 184, 789	2, 337, 885	2, 494, 000
Texas	818, 579	1, 591, 749	2, 235, 527	3, 048, 710	3, 896, 542	4, 663, 228	5, 447, 000
Utah	86, 786	143, 963	210, 779	276, 749	373, 351	449, 396	527, 000
Vermont	330, 551	332, 286	332, 422	343, 641	355, 956	352, 428	[4] 352, 428
Virginia	1, 225, 163	1, 512, 565	1, 655, 980	1, 854, 184	2, 061, 612	2, 309, 187	2, 562, 000
Washington	23, 955	75, 116	357, 232	518, 103	1, 141, 990	1, 356, 621	1, 576, 000
West Virginia	442, 014	618, 457	762, 794	958, 800	1, 221, 119	1, 463, 701	1, 712, 000
Wisconsin	1, 054, 670	1, 315, 497	1, 693, 330	2, 069, 042	2, 333, 860	2, 632, 067	2, 937, 000
Wyoming	9, 118	20, 789	62, 555	92, 531	145, 965	194, 402	245, 000

Bureau of the Census.

[1] Enumeration of United States census.
[2] Estimate of the Bureau of the Census.
[3] Includes population (325,464) of Indian Territory and Indian reservations, specially enumerated in 1890, but not included in the general report on population for 1890.
[4] Population Jan. 1, 1920; decrease 1910 to 1920.
[5] Estimate not used, result unsatisfactory.
[6] Population State census, 1925.
[7] Includes population (180,182 in 1890 and 392,060 in 1900) of Indian Territory.

TABLE 550.—*Farm family living expenditures, Vinton, Jackson, and Meigs Counties, Ohio, and Laurel County, Ky.*[1]

	Vinton, Jackson, and Meigs Counties, Ohio				Laurel County, Ky.			
	Furnished by farm	Purchased	Total	Per cent of living expenditure	Furnished by farm	Purchased	Total	Per cent of living expenditure
	Dollars	*Dollars*	*Dollars*	*Pct.*	*Dollars*	*Dollars*	*Dollars*	*Pct.*
All family living	401	532	933	100.0	365	324	689	100.0
Food, including groceries	322	135	457	49.0	308	114	422	61.2
Clothing		156	156	16.7	[2] 1	93	94	13.6
Rent (10 per cent value of house)	67		67	7.2	44		44	6.5
Furniture and furnishings		31	31	3.3		15	15	2.1
Operation goods	12	86	98	10.5	11	36	47	6.8
Maintenance of health		31	31	3.3		16	16	2.3
Advancement		46	46	4.9		30	30	4.4
Personal		29	29	3.1	[3] 1	17	18	2.6
Insurance		13	13	1.4		3	3	.5
Unclassified		5	5	.6		0	0	.0
Per cent of total furnished and purchased	43.0	57.0	100.0	100.0	52.9	47.1	100.0	100.0

Bureau of Agricultural Economics.

[1] The Ohio study is for 1 year ended Mar. 31, 1927, and the Kentucky study 1 year ended June 30, 1928.
[2] Wool, grown on the farm and made into clothing.
[3] Tobacco, grown on the farm.

TABLE 551.—*Distribution of value of goods used and proportion of total living furnished by farm for farm families of Vinton, Jackson, and Meigs Counties, Ohio, and Laurel County, Ky.*

VINTON, JACKSON, AND MEIGS COUNTIES, OHIO. YEAR ENDING MARCH 31, 1927

	Groups of value of goods used				
	Below $600	$600 to $899	$900 to $1,199	$1,200 and over	All groups
	Number	*Number*	*Number*	*Number*	*Number*
Families	49	102	93	56	300
Average size of family (persons)	2.4	3.5	4.1	5.5	3.9
Average size of household (persons)	2.6	3.8	4.7	6.1	4.3
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Average value of goods used per family	485	755	1,037	1,474	933
Distribution of value of goods used:	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Food	58.1	51.7	49.3	43.5	49.0
Clothing	11.7	14.4	17.1	19.9	16.7
Rent	8.4	8.5	6.9	6.0	7.2
Furniture and furnishings	2.1	2.7	3.0	4.6	3.3
Operation goods	10.8	11.2	10.5	9.8	10.5
Maintenance of health	2.6	2.7	3.4	4.0	3.3
Advancement	3.2	3.4	4.7	6.8	4.9
Personal	2.9	3.6	3.3	2.7	3.1
Insurance, life, and health	.2	.6	1.5	2.3	1.4
Unclassified		1.2	.3	.4	.6
Total	100.0	100.0	100.0	100.0	100.0
Living furnished by farm	49.4	46.5	42.8	38.1	43.0
Living purchased	50.6	53.5	57.2	61.9	57.0
Total	100.0	100.0	100.0	100.0	100.0
Food furnished by farm	66.3	70.4	70.5	71.9	70.4
Food purchased	33.7	29.6	29.5	28.1	29.6
Total	100.0	100.0	100.0	100.0	100.0

TABLE 551.—*Distribution of value of goods used and proportion of total living furnished by farm for farm families of Vinton, Jackson, and Meigs Counties, Ohio, and Laurel County, Ky.*—Continued

LAUREL COUNTY, KY. YEAR ENDING JUNE 30, 1928

	Groups of value of goods used				
	Below $600	$600 to $899	$900 to $1,199	$1,200 and over	All groups
	Number	*Number*	*Number*	*Number*	*Number*
Families	91	74	26	12	203
Average size of family (persons)	4.0	5.3	5.5	6.5	4.8
Average size of household (persons)	4.4	5.8	5.8	7.2	5.3
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Average value of goods used per family	453	736	1,034	1,453	689
Distribution of value of goods used:	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Food	68.1	62.3	54.4	51.6	61.2
Clothing	10.3	13.4	15.1	19.7	13.6
Rent	6.5	6.1	7.1	6.6	6.5
Furniture and furnishings	1.4	2.3	3.1	1.7	2.1
Operation goods	7.0	6.4	7.2	6.9	6.8
Maintenance of health	1.5	2.4	3.8	1.5	2.3
Advancement	3.1	3.6	6.4	7.1	4.4
Personal	2.0	3.1	1.9	3.3	2.6
Insurance, life, and health	----------	.4	.9	1.6	.5
Unclassified	.1	.0	.1	.0	.0
Total	100.0	100.0	100.0	100.0	100.0
Living furnished by farm	57.5	53.8	50.4	43.4	52.9
Living purchased	42.5	46.2	49.6	56.6	47.1
Total	100.0	100.0	100.0	100.0	100.0
Food furnished by farm	71.2	73.4	77.8	69.7	73.0
Food purchased	28.8	26.6	22.2	30.3	27.0
Total	100.0	100.0	100.0	100.0	100.0

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TABLE 552.—*Associations marketing dairy products: Number listed 1929, and estimated business, 1928*

State	Creameries		Cheese factories		Milk distributing associations		Milk bargaining associations		Miscellaneous [1]		Total associations	
	Number listed	Estimated business	Number listed	Estimated business	Number listed	Estimated business	Number listed	Estimated business	Number listed	Estimated business	Number listed	Estimated business
		Thousands		*Thousands*		*Thousands*		*Thousands*		*Thousands*		*Thousands*
New York	6	420	30	1,300	9	90,000	1	30,000	23	700	69	122,420
Minnesota	624	85,000	30	1,400	3	11,000	------	--------	6	1,200	663	98,600
Wisconsin	255	50,000	592	22,500	12	5,000	5	15,000	66	1,500	930	94,000
Pennsylvania	18	1,200	5	140	7	1,000	2	45,000	7	600	39	47,940
Iowa	248	40,000	------	-------	3	500	4	3,000	4	300	259	43,800
Massachusetts	3	60	------	-------	9	5,000	1	35,000	------	-------	13	40,060
California	14	18,000	------	-------	3	8,000	2	7,000	1	60	20	33,060
Michigan	53	9,500	9	510	9	3,100	2	9,000	12	2,500	85	24,610
Ohio	6	1,400	6	90	5	5,000	9	12,000	6	1,100	32	19,590
Washington	14	6,500	2	550	7	3,000	1	3,000	3	3,900	27	16,950
Connecticut	2	20	------	-------	2	200	1	15,000	1	60	6	15,280
Maryland	------	-------	------	-------	1	400	2	12,000	------	-------	3	12,400
Vermont	18	1,650	1	150	13	8,500	------	--------	3	300	35	10,600
All others	139	31,250	65	3,360	31	9,300	17	14,000	67	2,780	319	60,690
United States	1,400	245,000	740	30,000	114	150,000	47	200,000	199	15,000	2,500	640,000

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[1] Including federations, sales agencies, cream stations, warehouse associations, associations renting dairy plants, etc.

TABLE 553.—*Livestock receipts, sales, and purchases by terminal market cooperative sales agencies, 1928*

Market	Number of agencies	Animals received, 1928				Animals purchased, 1928				Animals handled for traders	Total animals	Sales	Purchases	Total business
		Cattle and calves	Hogs	Sheep	Total	Cattle and calves	Hogs	Sheep	Total					
		Number	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*	*Thousands*	*Thousands*	*Thousands*
Buffalo	1	39, 828	304, 175	164, 042	508, 045	------	------	------	------	------	508, 045	$9, 185	------	$9, 185
Chicago	2	172, 409	1, 307, 999	427, 340	1, 907, 748	5, 573	------	52, 549	58, 122	14, 234	1, 980, 104	47, 189	$886	48, 075
Cincinnati	1	47, 859	269, 237	34, 998	352, 094	112	------	23	135	2, 091	354, 320	7, 842	6	7, 848
Cleveland	1	41, 003	198, 922	101, 293	341, 218	------	------	------	------	------	341, 218	6, 210	------	6, 210
Denver	1	12, 398	99, 297	83, 369	195, 064	9, 513	165	56, 218	65, 896	1, 663	262, 623	3, 812	1, 084	4, 896
Detroit	1	92, 380	176, 143	147, 205	415, 728	3, 463	------	26, 419	29, 882	660	446, 270	8, 188	377	8, 565
East St. Louis	2	330, 183	1, 617, 798	162, 378	2, 110, 359	10, 081	332	452	10, 865	30, 961	2, 152, 185	48, 658	556	49, 213
Evansville	1	26, 879	102, 511	6, 938	136, 328	------	------	------	------	------	136, 328	3, 077	------	3, 077
Fort Worth	1	56, 081	8, 710	5, 752	70, 543	1, 098	33	721	1, 852	1, 089	73, 484	3, 426	63	3, 489
Indianapolis	1	105, 345	663, 149	54, 680	823, 174	316	928	354	1, 598	5, 165	829, 937	19, 440	36	19, 476
Kansas City	2	87, 270	375, 050	74, 357	536, 677	35, 755	3, 744	19, 937	59, 436	5, 661	601, 774	14, 913	2, 664	17, 577
Milwaukee	1	94, 908	91, 045	6, 332	192, 285	------	------	------	------	------	192, 285	3, 989	------	3, 989
Muncie	1	5, 831	52, 339	5, 738	63, 908	------	------	------	------	------	63, 908	1, 259	------	1, 259
Omaha	1	43, 752	429, 446	40, 879	514, 077	4, 035	1, 432	30, 011	35, 478	4, 270	553, 825	13, 004	508	13, 512
Peoria	1	13, 330	180, 628	2, 499	196, 457	------	------	------	------	------	196, 457	4, 333	------	4, 333
Pittsburgh	1	25, 660	206, 559	79, 715	311, 934	------	------	------	------	------	311, 934	5, 648	------	5, 648
St. Joseph	1	60, 379	454, 245	40, 927	555, 551	9, 222	378	1, 754	11, 354	3, 447	570, 352	14, 155	798	14, 953
Sioux City	2	53, 676	572, 127	48, 585	674, 388	5, 777	1, 159	5, 709	12, 645	18, 129	705, 162	18, 237	442	18, 679
South St. Paul	3	401, 952	1, 236, 430	188, 611	1, 826, 993	17, 057	6, 535	9, 734	33, 326	3, 654	1, 863, 973	43, 005	1, 102	44, 107
Springfield, Ill	1	1, 749	26, 836	499	29, 084	------	------	------	------	------	29, 084	617	------	617
Springfield, Mo	1	8, 764	30, 576	2, 689	42, 029	------	11	------	11	------	42, 040	------	------	738
Wichita	1	29, 963	80, 191	8, 063	118, 217	2, 234	2, 275	158	4, 667	808	123, 692	3, 487	219	3, 707
Total	28	1, 751, 599	8, 483, 413	1, 686, 889	11, 921, 901	104, 236	16, 992	204, 039	325, 267	91, 832	12, 339, 000	279, 674	8, 741	289, 153

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TABLE 554.—*Wheat pools, volume of wheat received,*[1] *1921–22 to 1928–29*

[Data from reports to U. S. Department of Agriculture]

Association	Address	Year organized	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29
			Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
California Farm Bureau Exchange	Berkeley	1922		1,295,571	2,344,588	(2)				
Colorado Wheat Growers Association	Denver	1922		87,795	1,301,666	1,191,500	584,478	400,000	(2)	
Idaho Wheat Growers Association	Lewiston	1920	[3] 1,270,991 [4] 917,879	[4] 424,000	(2)					
Central States Soft Wheat Growers Association [5]	Indianapolis	1924				1,524,250	3,157,952	4,177,453	2,206,652	40,000
Kansas Wheat Growers Association	Wichita	1921		[6] 2,335,751	[6] 2,052,800					
Kansas Cooperative Wheat Marketing Association	Wichita	1924				6,138,112	2,631,758	4,055,243	2,465,423	4,692,517
Minnesota Wheat Growers Cooperative Marketing Association.	Minneapolis	1923			523,644	1,713,136	1,341,958	799,183	568,790	587,294
Montana Wheat Growers Association	Lewistown	1921		6,048,000	4,390,000	1,551,059	(2)			
Nebraska Wheat Growers Association	Hastings	1922		396,860	550,000	1,202,556	662,421	818,292	587,524	
North Dakota Wheat Growers Association	Grand Forks	1922		2,981,763	2,067,864	3,887,881	3,202,500	1,300,000	2,420,169	3,161,805
Oklahoma Wheat Growers Association	Enid	1921		[7] 2,961,074	[7] 4,560,787	[7] 6,281,067	[7] 2,800,675	2,436,899	1,448,000	5,308,100
Oregon Cooperative Grain Growers	Portland	1921	[8] 3,725,435	[8] 2,364,063	[8] 3,426,616	(2)				
South Dakota Wheat Growers Association	Aberdeen	1923			534,227	2,048,475	2,100,000	123,210	2,085,257	
Texas Wheat Growers Association	Amarillo	1922		[7] 218,520	[7] 1,210,489	[7] 2,429,208	[7] 341,818	3,384,446	553,731	745,000
Washington Wheat Growers Association	Spokane	1920	[8] 5,458,463	[8] 2,475,784	[8] 3,828,528	(2)				
Total			11,372,768	21,589,181	26,791,209	27,967,244	16,823,560	17,494,726	12,335,546	

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[1] As reported by associations.
[2] Ceased operating.
[3] Including 1,270,991 bushels for 10 northern counties of Idaho, marketed through Washington Wheat Growers Association, and 917,879 bushels for southern counties as a separate pool.
[4] Marketed through Northwest Wheat Growers Associated.
[5] Formerly Indiana Wheat Growers Association.
[6] Crops of 1922 and 1923 handled by Kansas Wheat Growers Association, which was superseded in 1924 by the Kansas Cooperative Wheat Marketing Association.
[7] Marketed through Southwest Wheat Growers Associated.
[8] Marketed through Northwest Wheat Growers Associated.

TABLE 555.—*Livestock handled: Sales and purchases by terminal market cooperative sales agencies, 1917–1929*

[Number of associations reporting indicated in parentheses]

Year	Animals handled						Amount of business		
	Receipts [1]				Purchases	Total animals handled	Sales	Purchases	Total
	Cattle and calves	Hogs	Sheep	Total					
1918	(2) 30, 528	(2) 139, 483	(2) 7, 548	(3) 189, 283	(1) 252	(3) 189, 535	(4) $12, 384, 348	(1) $15, 901	(4) $12, 400, 249
1919	(3) 63, 876	(3) 381, 127	(3) 23, 940	(4) 563, 383	(2) 8, 504	(4) 571, 887	(6) 35, 178, 255	(3) 622, 335	(6) 35, 800, 590
1920	(3) 85, 313	(3) 536, 380	(3) 29, 676	(4) 748, 255	(2) 6, 550	(4) 754, 805	(6) 37, 419, 935	(3) 458, 824	(6) 37, 878, 759
1921	(5) 163, 361	(5) 912, 095	(5) 103, 101	(6) 1, 310, 628	(3) 42, 032	(6) 1, 352, 660	(6) 35, 309, 401	(4) 894, 972	(6) 36, 204, 373
1922	(15) 736, 982	(15) 3, 414, 016	(15) 352, 861	(16) 4, 727, 056	(4) 86, 350	(16) 4, 813, 406	(18) 101, 818, 588	(7) 3, 069, 638	(18) 104, 888, 226
1923	(22) 1, 409, 322	(22) 7, 732, 437	(22) 733, 552	(23) 9, 933, 445	(8) 103, 928	(23) 10, 037, 373	(22) 191, 954, 106	(11) 4, 631, 630	(23) 196, 904, 508
1924	(25) 1, 893, 326	(25) 9, 239, 070	(25) 1, 202, 616	(26) 11, 382, 304	(14) 242, 039	(26) 11, 624, 343	(24) 231, 372, 776	(15) 5, 222, 121	(24) 236, 594, 897
1925	(25) 1, 881, 241	(25) 7, 377, 084	(25) 1, 350, 311	(28) 10, 666, 069	(18) 288, 150	(28) 10, 954, 219	(24) 271, 797, 282	(15) 7, 923, 372	(24) 279, 720, 654
1926	(25) 2, 003, 014	(25) 6, 687, 296	(25) 1, 581, 882	(27) 10, 333, 307	(18) 328, 016	(27) 10, 661, 323	(23) 278, 900, 462	(16) 8, 249, 106	(24) 293, 249, 470
1927	(28) 1, 678, 094	(28) 7, 149, 561	(28) 1, 598, 465	(28) 10, 426, 120	(21) 280, 808	(28) 10, 793, 681	(16) 145, 202, 942	(9) 3, 036, 904	(28) 274, 209, 285
1928	(28) 1, 751, 599	(28) 8, 483, 413	(28) 1, 686, 889	(28) 11, 921, 901	(18) 325, 267	(28) 12, 339, 000	(27) 279, 674, 261	(18) 8, 741, 163	(28) 289, 152, 931

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[1] Including some animals sold for yard traders.
[2] Including sales for yard traders.

TABLE 556.—*Freight tonnage originating on railways in the United States, 1922–1928* [1]

Commodity	Calendar year 1922	1923	1924	1925	1926	1927	1928
FARM PRODUCTS							
Animals and animal products:	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Animals, live—							
Horses and mules	491	603	531	544	513	541	577
Cattle and calves	9, 567	9, 400	9, 316	9, 330	9, 241	8, 636	7, 976
Sheep and goats	1, 159	1, 159	1, 215	1, 224	1, 270	1, 296	1, 362
Hogs	5, 795	6, 944	6, 707	5, 502	5, 271	5, 369	5, 871
Packing-house products—							
Fresh meats	2, 614	3, 023	3, 001	2, 904	2, 996	2, 986	2, 935
Hides and leather	1, 081	1, 090	1, 025	1, 026	984	1, 010	914
Other packing-house products	2, 049	2, 397	2, 395	2, 140	2, 023	1, 957	1, 461
Total packing-house products	5, 744	6, 510	6, 421	6, 070	6, 003	5, 953	5, 310
Eggs	565	597	572	591	644	651	635
Butter and cheese	507	571	649	686	725	747	754
Poultry	292	366	376	357	408	407	407
Wool	360	291	294	263	281	356	394
Other animals and products	1, 750	1, 814	1, 668	1, 758	1, 888	2, 054	2, 348
Total animals and animal products	26, 230	28, 255	27, 749	26, 325	26, 244	26, 010	25, 634
Vegetable products:							
Cotton	3, 074	2, 887	3, 261	4, 127	4, 482	4, 182	3, 772
Fruits and vegetables	9, 683	10, 398	10, 868	11, 634	12, 223	12, 029	12, 947
Potatoes	4, 829	4, 698	4, 590	4, 614	4, 339	4, 728	4, 511
Grain and grain products—							
Grain—							
Wheat	24, 805	23, 091	27, 442	21, 548	24, 379	26, 237	26, 950
Corn	19, 275	15, 151	14, 883	12, 680	13, 924	13, 162	17, 045
Oats	7, 646	8, 332	8, 507	8, 450	6, 496	5, 518	5, 888
Other grain	5, 245	4, 739	5, 616	4, 564	4, 014	5, 216	5, 506
Grain products—							
Flour and meal	10, 694	10, 518	10, 330	9, 901	10, 137	10, 027	10, 754
Other mill products	9, 000	10, 002	10, 083	9, 578	9, 768	10, 179	10, 580
Total grain and grain products	76, 665	71, 833	76, 861	66, 721	68, 718	70, 339	76, 723
Hay, straw, and alfalfa	5, 723	5, 965	5, 802	5, 506	5, 028	4, 468	3, 999
Sugar, sirup glucose, and molasses	5, 091	4, 891	5, 356	5, 700	5, 744	5, 584	5, 604
Tobacco	882	1, 099	1, 069	1, 038	1, 010	1, 053	945
Other vegetable products	11, 868	13, 406	15, 277	17, 118	17, 609	18, 469	16, 686
Total vegetable products	117, 815	115, 177	123, 084	116, 458	119, 153	120, 852	125, 187
Canned goods (food products)	3, 106	3, 435	3, 731	4, 144	4, 070	4, 204	4, 805
Total farm products	147, 151	146, 867	154, 564	146, 927	149, 467	151, 066	155, 626
OTHER FREIGHT							
Products of mines	532, 998	713, 735	638, 520	678, 336	758, 064	713, 731	696, 583
Products of forests	89, 059	115, 618	108, 090	107, 391	104, 859	99, 391	96, 737
Manufactures	211, 308	258, 471	246, 432	274, 001	284, 640	279, 407	300, 043
Merchandise, all l. c. l. freight	43, 229	44, 339	40, 551	40, 587	39, 498	38, 432	36, 954
Total tonnage	1, 023, 745	1, 279, 030	1, 188, 157	1, 247, 242	1, 336, 528	1, 282, 027	1, 285, 943

Bureau of Agricultural Economics. Compiled from reports of the Interstate Commerce Commission. Figures for earlier years appear in previous issues of the Yearbook.

[1] Freight tonnage as delivered at original shipping point.

TABLE 557.—*Index numbers of freight rates on livestock, wheat, and cotton, 1913–1928*

Year beginning July 1	Livestock						
	Cattle				Hogs		
	Western district	Eastern district	Southern district	United States	Western district	Eastern district	United States
1913	100	100	100	100	100	100	100
1914	100	104	100	100	99	102	100
1915	100	108	99	101	99	107	101
1916	100	113	98	102	99	116	102
1917	101	116	98	103	100	122	104
1918	126	158	120	129	124	169	132
1919	128	157	120	131	124	169	132
1920	166	207	148	170	161	222	172
1921	165	211	147	170	160	230	173
1922	156	197	137	160	153	218	164
1923	155	201	136	160	153	217	164
1924	153	199	136	159	151	214	163
1925	153	199	136	158	150	214	161
1926	153	199	136	158	150	214	161
1927	152	199	136	157	150	214	161
1928 [1]	152	198	136	157	150	211	161

Year beginning July 1	Livestock—Continued				Wheat				Cotton
	Sheep			Total	Spring	Western	Winter	All wheat [2]	
	Western district	Eastern district	United States						
1913	100	100	100	100	100	100	100	100	100
1914	99	102	99	100	100	100	101	101	100
1915	98	105	99	101	101	100	100	100	100
1916	98	112	100	102	101	100	101	101	100
1917	99	129	103	103	101	100	101	101	103
1918	118	167	126	130	127	126	129	128	133
1919	119	167	127	131	127	126	128	128	136
1920	152	225	164	170	164	154	166	164	172
1921	148	226	160	170	160	148	162	160	176
1922	137	199	147	160	149	140	152	150	164
1923	137	200	147	160	149	140	152	150	164
1924	137	200	146	158	149	140	152	150	166
1925	135	200	145	157	148	140	152	150	166
1926	134	200	144	157	148	140	152	150	166
1927	134	200	144	157	148	140	151	149	165
1928 [1]	134	196	144	157	148	140	149	148	164

Bureau of Agricultural Economics. These relatives are based on the average of the monthly rates in effect during the crop year. Rates in effect in 1913=100. For points of origin and destination, see Yearbook, 1926, pp. 1248–1249.

[1] Based on rates in effect to Dec. 31, 1928.
[2] Index for spring, western, and winter wheat weighted respectively 2, 1, and 5. Weight based on average production, 1923–1927.

GENERAL NOTE.—Tables similar to Table 523, 1927 Yearbook, index numbers of cotton freight rates, by origin and destination, and Table 525, ocean freight rates, are omitted.

TABLE 558.—*Fertilizer and fertilizer materials: Production and value in the United States, 1926–1928*

Item	Quantity			Value		
	1926	1927	1928	1926	1927	1928
	Short tons	*Short tons*	*Short tons*	*Dollars*	*Dollars*	*Dollars*
Fish scrap, dried and acidulated	46, 992	44, 403	40, 089			
Lime sold for agricultural purposes [1]	297, 010	322, 893	333, 910	2, 153, 233	2, 237, 871	2, 287, 558
Lime, calcareous marl and peat for fertilizer:						
Calcareous marl, sold	55, 060	52, 962		146, 094	180, 166	
Hydrated lime, sold	184, 293	215, 027		1, 465, 572	1, 622, 082	
Limestone, pulverized, sold	1, 850, 620	2, 206, 470		3, 064, 235	3, 360, 704	
Peat produced [2]	61, 936			364, 413		
Total	2, 151, 909			5, 040, 314		
Phosphate rock sold or used:						
Florida—	*Long tons*	*Long tons*	*Long tons*			
Hard rock	116, 264	131, 254	92, 627	465, 308	525, 016	370, 508
Land pebble	2, 591, 943	2, 506, 166	2, 729, 334	8, 218, 200	8, 121, 146	8, 953, 798
Total	2, 708, 207	2, 637, 420	2, 821, 961	8, 683, 508	8, 646, 162	9, 324, 306
Tennessee and Kentucky—						
Brown and blue rock	464, 192	[3] 477, 172	[3] 577, 095	2, 048, 272	[3] 2, 300, 296	[3] 2, 853, 237
Other States	37, 577	51, 510	40, 865	162, 020	288, 405	162, 307
Total phosphate rock	3, 209, 976	3, 166, 102	3, 439, 921	10, 893, 800	11, 234, 863	12, 339, 850
Sulphur produced	1, 890, 027	2, 111, 618	1, 981, 873			
Pyrites produced	166, 559	215, 786	182, 049	616, 668	804, 006	605, 459

Bureau of Agricultural Economics. Compiled from annual reports of the American Fertilizer Handbook and the Bureau of Mines. Figures for earlier years appear in previous issues of the Yearbook.

[1] Porto Rico and Hawaii included.
[2] Production for all purposes.
[3] Tennessee only.

TABLE 559.—*Fertilizer and fertilizer materials: Production, consumption, imports, and exports, United States, 1924–1928*

Item	1924	1925	1926	1927	1928 [1]
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Sulphate of ammonia:					
Production [2]	544, 622	639, 019	690, 976	717, 460	748, 909
Sales [2]	660, 996	604, 457	682, 967		
Imports for consumption	6, 720	26, 613	9, 392	19, 211	[3] 47, 114
Exports	132, 571	137, 918	202, 860	155, 335	104, 177
Nitrate of soda, imports for consumption	1, 105, 035	1, 245, 693	1, 024, 009	838, 636	[3] 1, 156, 860
Sulphuric acid:					
Production (50° Baumé)	1, 576, 544	1, 979, 292	1, 745, 759	1, 656, 871	2, 126, 860
Imports for consumption	7, 734	18, 191	27, 969	17, 434	[3] 13, 164
Exports	5, 636	3, 769	4, 612	3, 756	3, 501
Made and consumed [4]	1, 782, 816	1, 316, 316	2, 058, 683	2, 137, 129	2, 440, 121
Superphosphate:					
Production [4] [5]	3, 250, 498	3, 846, 401	3, 799, 054	[6] 3, 699, 579	5, 505, 900
Sales [4] [7]	3, 381, 202	3, 550, 762	3, 536, 552	1, 915, 913	1, 284, 499
Potash:					
Production, domestic	43, 719	51, 565	46, 324	76, 819	104, 129
Sales, domestic	37, 492	52, 823	51, 369	94, 722	105, 208
Imports for consumption—					
Kainit	175, 513	204, 767	203, 702	115, 345	[3] 119, 897
Manure salts	258, 998	430, 340	354, 413	311, 357	[3] 453, 242
Muriate of potash	144, 623	180, 351	223, 049	183, 475	[3] 261, 644
Sulphate of potash	84, 780	77, 226	78, 258	77, 172	[3] 96, 833
Other potash bearing substances [8]	46, 946	29, 002	52, 357	10, 531	[3] 12, 047
Total imports for consumption	710, 860	921, 686	911, 779	697, 880	[3] 943, 663

Bureau of Agricultural Economics. Compiled from annual reports of the Bureau of the Census, Bureau of Foreign and Domestic Commerce and the Bureau of Mines.

[1] Subject to revision.
[2] By-product of coke ovens. Production from other sources (coal gas, bone carbonizing, etc.) accounted for less than 5 per cent of the total production for these years.
[3] General imports.
[4] Fertilizer establishments only.
[5] Bulk superphosphate and superphosphate for mixed fertilizers.
[6] Bulk superphosphate.
[7] Quantity sold as superphosphate or used in manufactured goods sold.
[8] Includes ashes (wood), beet root, other potash bearing substances (alunite, leucite, etc.,) used for fertilizer.

TABLE 560.—*Nitrogen: World production and consumption, year ended May, 1928*

Item	Production		Utilization		
	Quantity	Percentage of total	In agriculture	In industry	Total
	Short tons	*Per cent*	*Short tons*	*Short tons*	*Short tons*
By-product ammonia	430, 600	23. 6			
Chilean nitrate	429, 000	23. 6			
Arc process	33, 000	1. 8			
Cyanamide process	250, 000	13. 7			
Direct synthetic ammonia	680, 000	37. 3			
Total	1, 822, 600	100. 0	1, 595, 240	167, 000	1, 762, 240

Bureau of Chemistry and Soils.

TABLE 561.—*Nitrogeneous materials: Production and imports, United States, 1900–1928*

Year	Production			Imports								
	By-product ammonia	Air nitrogen (estimated)	Total	Chilean nitrate	Ammonium sulfate	Cyanamide	Calcium nitrate	Ammonium chloride	Ammonium nitrate	Sodium cyanide	Ammonium-sulfate-nitrate	Total nitrogen
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
1900				217	11							
1901				222	12							
1902	7		7	225	11							
1903	8		8	256	9							
1904	11		11	255	11							
1905	13		13	360	5							
1906	15		15	417	15							
1907	20		20	408	28							
1908	17		17	348	32							
1909	23		23	473	43							
1910	23		23	593	92	3						
1911	25		25	610	96	6						
1912	29		29	545	60	12						
1913	39		39	701	65	30						
1914	38		38	607	83	24						
1915	46		46	865	36	34						
1916	59		59	1, 365	15	32						
1917	67		67	1, 728	8	53						
1918	78		78	2, 066	3	51						
1919	85	[1]	85	456	3	70						
1920	104	[1]	104	1, 481	2	80						
1921	74	[1]	74	413	5	19						
1922	97	1	98	608	5	43						
1923	123	6	129	999	4	77	10	3	10			177
1924	117	11	128	1, 105	7	85	9	5	2			191
1925	136	13	149	1, 246	27	109	9	5	5	17		229
1926	146	14	160	1, 024	9	99	15	8	4	14		189
1927	152	18	170	839	19	123	20	7	6	16	50	182
1928	170	26	196	1, 157	47	152	26	6	7	19	92	255

Bureau of Chemistry and Soils.

[1] Not over 500 tons.

TABLE 562.—*Nitrogen: Production, imports, exports, and consumption, United States, 1923–1928*

Item	1923	1924	1925	1926	1927	1928
	1,000 short tons	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*	*1,000 short tons*
Production	129	128	149	160	170	196
Imports	177	191	229	189	182	255
Total	306	319	378	349	352	451
Exports	40	32	32	48	44	36
Remaining for consumption	266	287	346	301	308	415
	Per cent	*Per cent*	*Per cent*	*Per cent*	*Per cent*	*Per cent*
Percentage domestic production is of total	49. 5	44. 5	43. 3	53. 0	55. 0	47. 0

Bureau of Chemistry and Soils.

Table 563.—*Fertilizer: Quantity consumed by States, 1923–1929*

COMMERCIAL FERTILIZER

State	Year ended	1923	1924	1925	1926	1927	1928	1929
		Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Maine	Dec. 31	168,000	182,000	185,000	147,000	183,750	178,750	
New Hampshire	June 30	17,000	16,000	16,000	14,680	16,875	16,900	
Vermont	do	18,000	17,000	18,000	18,000	15,663	16,911	
Massachusetts	do	63,709	61,968	62,656	58,920	71,734	70,458	
Rhode Island	Mar. 31	9,000	8,800	9,000	8,100	10,125	10,100	
Connecticut	Dec. 31	70,000	70,000	70,000	70,000	65,000	72,000	
New York	do	250,000	250,000	253,000	234,000	260,000	260,000	
New Jersey	Oct. 31	157,497	152,827	146,687	135,141	141,635	143,574	
Pennsylvania	do	308,742	319,685	326,121	328,904	326,514	328,500	
North Atlantic		1,061,948	1,078,280	1,086,464	1,014,745	1,091,296	1,097,193	
Ohio	Dec. 31	303,120	321,287	321,960	304,480	312,703	320,866	
Indiana	do	198,581	192,417	226,148	228,280	240,498	223,772	
Illinois	do	16,719	17,527	24,582	25,227	26,000	30,509	
Michigan	do	83,645	94,575	109,327	105,014	117,227	124,000	
Wisconsin	do	15,000	15,000	12,500	16,000	22,520	33,041	
Minnesota	do	4,500	4,450	5,000	11,316	11,172	10,100	
Iowa	do	4,000	4,500	6,000	6,021	7,181	10,000	
Missouri	do	51,597	47,121	63,939	56,891	56,100	64,922	
North Dakota	do	150	200	225	250	398	450	
South Dakota	do	150	150	150	150	200	220	
Nebraska	do	500	500	500	500	500	500	
Kansas	do	4,600	4,500	4,138	7,746	7,800	9,162	
North Central		682,562	702,227	774,469	761,875	802,299	827,542	
Delaware	Dec. 31	36,931	36,224	41,006	43,084	41,126	37,893	
Maryland	do	155,168	151,211	165,474	163,285	165,174	173,159	
Virginia [1]	do	422,350	441,895	451,656	435,223	408,158	[2] 336,173	[2] 326,453
West Virginia	do	40,000	40,000	41,000	43,209	43,200	44,900	
North Carolina [1]	June 30	1,081,813	1,189,316	1,217,468	1,213,178	1,144,019	1,378,348	1,305,034
South Carolina [1]	do	678,795	879,093	866,377	840,955	720,396	817,548	760,085
Georgia [1]	do	677,040	688,783	770,889	760,643	705,053	898,405	870,300
Florida [1]	May 31	378,885	386,521	361,849	355,373	402,842	463,000	449,000
South Atlantic		3,470,982	3,813,043	3,915,719	3,854,950	3,629,968	4,149,426	
Kentucky	Dec. 31	90,000	85,000	93,000	91,500	70,500	90,500	
Tennessee [1]	May 31	105,417	135,270	155,248	135,257	115,973	156,956	148,643
Alabama [1]	Sept. 30	436,786	472,260	580,000	603,444	468,683	[2] 690,267	[2] 671,950
Mississippi [1]	do	215,854	213,516	257,763	280,890	212,562	[3] 316,893	[3] 335,560
Arkansas [1]	do	74,774	89,119	122,742	103,931	64,192	[3] 103,880	[3] 117,669
Louisiana [1]	Aug. 31	108,712	129,288	103,989	116,049	91,090	[4] 132,002	[4] 166,898
Oklahoma	June 30	3,600	4,000	5,000	5,418	4,263	[5] 8,260	
Texas [1]	Aug. 31	76,223	126,592	103,416	123,990	79,560	[4] 137,567	[4] 193,576
South Central		1,111,366	1,255,045	1,421,158	1,460,479	1,106,823	1,636,325	
Montana	Dec. 31	100	100	90	90	90	100	
Idaho	June 30	400	400	400	420	450	450	
Wyoming	Dec. 31	100	100	100	100	100	100	
Colorado	do	250	250	250	337	607	728	
New Mexico	do	450	500	800	1,566	1,256	1,400	
Arizona	do	500	500	500	500	700	1,000	
Utah	do	500	500	500	500	500	500	
Nevada	do	30	30	30	30	30	30	
Washington	do	10,000	11,000	12,000	12,207	14,244	15,500	
Oregon	do	8,000	7,500	8,000	8,000	9,000	10,000	
California	do	71,819	66,274	85,933	93,845	102,524	116,942	
Far Western		92,149	87,154	108,603	117,595	129,501	146,750	
United States		6,419,007	6,935,749	7,306,413	7,209,644	6,759,887	7,857,236	

COTTONSEED MEAL USED AS FERTILIZER [6]

State	Year ended	1923	1924	1925	1926	1927	1928	1929
North Carolina [2]	June 30	108,772	117,626	109,029	150,377	176,476	112,165	99,354
Mississippi [2]	Sept. 30	41,867	49,923	62,090	71,937	98,562	51,015	50,760

Bureau of Agricultural Economics. Figures for cotton States based on sales of fertilizer tags as noted. Data for States other than cotton States compiled from reports of the National Fertilizer Association quoting figures from surveys, private estimates, and State records.

[1] Based on sales of fertilizer tags. Figures for earlier years appear in previous issues of the Yearbook.
[2] To July 1.
[3] To June 1.
[4] To May 1.
[5] Calendar year.
[6] Not separately reported except for North Carolina and Mississippi.

TABLE 564.—*Fertilizer used on cotton, 1927–1929*

State	Acreage in cotton					
	July 1			Fertilized		
	1927 [1]	1928	1929	1927	1928	1929
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Missouri	305	355	350	15	18	18
Virginia	65	81	89	62	79	86
North Carolina	1,749	1,892	1,818	1,679	1,873	1,782
South Carolina	2,454	2,485	2,228	2,258	2,336	2,050
Georgia	3,501	3,883	3,847	3,291	3,728	3,693
Florida	67	101	97	56	87	81
Tennessee	985	1,145	1,137	473	698	682
Alabama	3,214	3,643	3,633	2,828	3,388	3,342
Mississippi	3,408	4,154	4,133	1,329	2,035	2,190
Arkansas	3,142	3,834	3,900	943	1,534	1,560
Louisiana	1,585	2,052	2,079	634	882	1,040
Oklahoma	4,187	4,420	4,655	21	44	93
Texas	16,850	18,330	18,912	421	1,100	1,324
New Mexico	100	123	132	1		
Arizona	140	202	227			
California	130	223	317			
All other	23	23	15			
United States	41,905	46,946	47,569	14,011	17,802	17,941

State	Fertilizer used					
	Average per acre			Total		
	1927	1928	1929	1927	1928	1929
	Pounds	*Pounds*	*Pounds*	*Short tons*	*Short tons*	*Short tons*
Missouri	125	125	140	938	1,125	1,260
Virginia	375	375	390	11,625	14,812	16,770
North Carolina	420	440	438	352,590	412,060	390,258
South Carolina	315	325	330	355,635	379,600	338,250
Georgia	247	260	265	406,438	484,640	489,322
Florida	215	255	240	6,020	11,092	9,720
Tennessee	206	216	218	48,719	75,384	74,338
Alabama	243	262	270	343,602	443,828	451,170
Mississippi	216	220	220	143,532	223,850	240,900
Arkansas	173	187	188	81,570	143,429	146,640
Louisiana	175	185	185	55,475	81,585	96,200
Oklahoma	145	190	180	1,522	4,180	8,370
Texas	185	197	185	38,942	108,350	122,470
New Mexico	165			82		
Arizona						
California						
All other						
United States	264	268	266	1,846,690	2,383,935	2,385,668

[1] Acreage in cotton June 25.

TABLE 564.—*Fertilizer used on cotton, 1927–1929*—Continued

State	Value								
	Average price per ton			Total			Average per acre		
	1927	1928	1929	1927	1928	1929	1927	1928	1929
	Dollars	*Dollars*	*Dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*Dollars*	*Dollars*	*Dollars*
Missouri	35. 50	34. 40	36. 00	33	39	45	2. 20	2. 17	2. 50
Virginia	24. 00	28. 30	27. 30	279	419	458	4. 50	5. 30	5. 33
North Carolina	21. 00	29. 00	28. 00	8, 462	11, 950	10, 927	5. 04	6. 38	6. 13
South Carolina	22. 00	27. 30	26. 90	7, 824	10, 363	9, 099	3. 47	4. 44	4. 44
Georgia	23. 00	29. 70	29. 40	9, 348	14, 394	14, 386	2. 84	3. 86	3. 90
Florida	27. 50	30. 80	30. 00	166	342	292	2. 96	3. 93	3. 60
Tennessee	28. 30	33. 20	35. 70	1, 379	2, 503	2, 654	2. 92	3. 59	3. 89
Alabama	28. 00	32. 20	31. 50	8, 934	14, 291	14, 212	3. 16	4. 22	4. 25
Mississippi	32. 30	36. 50	38. 00	4, 636	8, 171	9, 154	3. 49	4. 02	4. 18
Arkansas	31. 50	37. 00	37. 00	2, 569	5, 307	5, 426	2. 72	3. 46	3. 48
Louisiana	34. 00	39. 30	39. 10	1, 886	3, 206	3, 761	2. 97	3. 63	3. 62
Oklahoma	32. 00	32. 00	31. 20	49	134	261	2. 33	3. 05	2. 81
Texas	33. 20	38. 50	37. 50	1, 293	4, 171	4, 593	3. 07	3. 79	3. 47
New Mexico	32. 50			3			3. 00		
Arizona									
California									
All other									
United States	25. 38	31. 58	31. 55	46, 861	75, 290	75, 268	3. 34	4. 23	4. 20

Bureau of Agricultural Economics. Based on returns from crop correspondents. Figures for earlier years appear in previous issues of the Yearbook.

TABLE 565.—*Insecticides and fungicides: Average wholesale price per pound, New York, 1919–1928* [1]

Year	Arsenic white	Calcium arsenate	Lead arsenate		Paris green	Bordeaux mixture		Lime-sulphur solution per gallon
			Powder	Paste		Powder	Paste	
	Cents	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*	*Cents*
1919	9. 9		29. 9	14. 9	35. 8	16. 5	12. 4	19. 1
1920	13. 8		26. 3	13. 3	36. 2	19. 3	13. 2	18. 8
1921	7. 9	19. 1	19. 4	11. 6	27. 0	17. 2	10. 9	16. 6
1922	8. 9	13. 7	14. 8	11. 1	22. 6	16. 8	10. 8	16. 5
1923	14. 2	16. 4	22. 2	15. 7	30. 4	22. 0	16. 3	16. 5
1924	9. 4	10. 6	20. 9	13. 1	28. 8	16. 3	12. 5	16. 5
1925	5. 1	7. 8	15. 6	11. 0	21. 5	13. 2	11. 0	16. 5
1926	3. 8	8. 0	14. 6	11. 0	18. 4	11. 5	11. 0	14. 7
1927	4. 0	7. 5	13. 8		19. 2	11. 5	11. 0	15. 5
1928	4. 4	6. 8	14. 1		27. 0	11. 3	10. 9	15. 5

Bureau of Agricultural Economics. Compiled from the Oil, Paint, and Drug Reporter.

[1] Average of monthly range.

TABLE 566.—*Insecticides and fungicides: Production of certain arsenic compounds, and quantity of arsenic used in their manufacture, specified years*

Year ended	Calcium arsenate	Lead arsenate		Paris green	Arsenic (99 per cent prime white) used in the manufacture of—		
		Powder	Paste		Calcium arsenate	Lead arsenate	Paris green
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*	*Pounds*
Dec. 31:							
1919	1, 191, 868	11, 465, 788					
1921	2, 419, 684	9, 229, 701					
1923	13, 261, 233	10, 755, 137					
June 30:							
1925	19, 911, 262	13, 523, 902	341, 580	3, 544, 887	7, 702, 069	3, 932, 644	2, 441, 540
1926	5, 363, 320	16, 573, 784	324, 430	2, 863, 691	2, 111, 782	5, 384, 193	2, 255, 069
Aug. 31, 1927	18, 715, 563	18, 359, 122	368, 932	5, 743, 048	7, 012, 219	5, 153, 103	4, 195, 693

Bureau of Agricultural Economics. Compiled from reports of the Bureau of the Census.

TABLE 567.—*Raw silk: Production in specified countries, average 1909–1913, 1921–1925, annual 1925–1928*

Country	Average, 1909–1913	Average, 1921–1925	1925	1926	1927	1928
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*	*1,000 pounds*
WESTERN EUROPE						
Italy	8,524	9,487	9,656	8,499	10,201	10,662
France	992	548	573	529	650	452
Spain	182	177	221	187	183	174
Total	9,698	10,212	10,450	9,215	11,034	11,288
Eastern Europe, Levant, and Central Asia [1]	6,611	1,874	2,524	2,359	2,293	2,513
FAR EAST						
China:						
Exports from Shanghai	12,576	10,456	12,599	12,225	13,283	14,154
Exports from Canton	5,146	6,418	6,923	7,055	5,809	6,162
Japan:						
Exports from Yokohama and Kobe [2]	21,898	46,336	56,978	66,193	68,839	74,075
British India:						
Exports from Bengal and Cashmere	428	121	66	121	176	132
Indo-China:						
Exports from Saigon, Haipong, etc	[3] 32	84	132	143	132	110
Total	40,080	63,415	76,698	85,737	88,239	94,632
Grand total	56,389	75,501	89,672	97,311	101,566	108,433

Bureau of Agricultural Economics. Compiled from Statisque de la Production de la Soie, Silk Merchants Union, Lyon, France.

[1] Includes Hungary, Czechoslovakia, Yugoslavia, Rumania, Bulgaria, Greece, Salonika, Adrianopole Crete, the Caucasus, Turkestan, Central Asia, and Persia.
[2] Previous to 1923 only exports from Yokohama are included.
[3] For years 1911–1913.

TABLE 568.—*Raw silk: Net imports, and price per pound, 1900–1928*

Year ended Dec. 31	Net imports [1] Total	Net imports [1] Per capita	Average price per pound [2]	Year	Net imports [1] Total	Net imports [1] Per capita	Average price per pound [2]
	1,000 pounds	*Pound*	*Dollars*		*1,000 pounds*	*Pound*	*Dollars*
1900	9,554	0.125	4.169	1915	36,958	0.372	3.318
1901	13,539	.174	3.513	1916	40,406	.401	4.867
1902	15,518	.196	3.822	1917	42,971	.420	5.494
1903	14,400	.178	4.135	1918	48,163	.465	6.273
1904	20,643	.250	3.642	1919	55,035	.524	8.880
1905	19,418	.231	3.991	1920	38,798	.365	8.277
1906	18,526	.216	4.163	1921	51,846	.478	6.035
1907	17,556	.201	5.060	1922	57,827	.526	7.219
1908	19,856	.223	3.890	1923	61,511	.551	8.228
1909	24,583	.271	3.840	1924	59,626	.524	5.917
1910	25,150	.273	3.524	1925	76,003	.659	6.341
1911	25,907	.277	3.471	1926	76,870	.656	5.937
1912	29,518	.310	3.445	1927	85,036	.717	5.100
1913	33,996	.352	3.640	1928	87,170	.726	4.859
1914	30,600	.312	3.694				

Bureau of Agricultural Economics. Compiled from December issues of "Monthly summary of Foreign Commerce of United States" prior to 1918. Subsequent years are from annual issues of "Commerce and Navigation of United States" of the Department of Commerce. Prices are from bulletins of the U. S. Bureau of Labor Statistics.

[1] Net imports are imports minus reexports.
[2] Monthly average of price per pound of Japanese Kansai, No. 1.

TABLE 569.—*Rayon, yarn: Production, net imports, amount available for consumption and price in the United States, 1911–1928*

Year ended Dec. 31	Production	Net imports [1]	Available for consumption		Average price per pound	
			Total	Per capita	150–A denier [2]	300–A denier [2]
	1,000 pounds	*1,000 pounds*	*1,000 pounds*	*Pound*	*Dollars*	*Dollars*
1911	320	823	1,143	0.012		
1912	1,120	1,549	2,669	.028		
1913	1,566	2,298	3,864	.040	1.850	1.700
1914	2,445	2,918	5,363	.055	1.963	1.813
1915	4,111	2,707	6,818	.069	2.125	1.975
1916	5,744	860	6,604	.066	3.113	2.950
1917	6,697	546	7,243	.071	3.863	3.650
1918	5,828	66	5,894	.057	4.396	4.146
1919	8,174	1,147	9,321	.089	4.767	4.517
1920	10,240	1,799	12,039	.113	4.663	4.413
1921	15,000	3,419	18,419	.170	2.671	2.479
1922	24,406	2,993	27,399	.249	2.800	2.650
1923	36,477	6,515	42,992	.385	2.800	2.650
1924	37,720	6,569	44,289	.389	2.113	1.871
1925	51,902	12,363	64,265	.557	2.004	1.754
1926	63,648	13,918	77,566	.662	1.810	1.603
1927	75,555	17,740	73,295	.786	1.489	1.289
1928 (preliminary)	97,901	15,222	113,123	.943	1.500	1.300

Bureau of Agricultural Economics. Compiled from December issues of "Monthly Summary of Foreign Commerce of United States" prior to 1918. Subsequent years are from annual issues of Commerce and Navigation of United States Department of Commerce. Production figures are from "Yearbook of the Department of Commerce." Prices are from Bulletins of the United States Bureau of Labor Statistics.

[1] Net imports are imports minus reexports, years 1911 through 1924; and imports minus exports and reexports, 1925–1928.

[2] The count indicates the number of deniers or one-half decigram units, in weight, of a standard length of 450 meters. Since the standard is based on an arbitrary fixed length and a variable weight, the finer the yarn the smaller the count; 150 denier count, a size commonly used, is fine and 300 denier count is coarse.

TABLE 570.—*Federal-aid highway system: Mileage, Federal-aid apportionment for fiscal year 1931, and total apportionment for years 1917 to 1931, inclusive*

State	Mileage in approved system June 30, 1929	Apportionment for fiscal year 1931	Aggregate of apportionment for fiscal years 1917 to 1931 inclusive	State	Mileage in approved system June 30, 1929	Apportionment for fiscal year 1931	Aggregate of apportionment for fiscal years 1917 to 1931 inclusive
Alabama	3,884.0	1,557,372	20,555,751	New Hampshire	980.9	365,625	4,631,992
Arizona	1,498.0	1,062,190	13,856,625	New Jersey	1,181.7	936,234	12,210,821
Arkansas	5,019.4	1,293,086	16,742,953	New Mexico	3,367.7	1,190,296	15,727,891
California	4,781.0	2,501,170	32,039,182	New York	5,451.0	3,605,965	48,534,004
Colorado	3,332.0	1,390,524	17,865,012	North Carolina	3,944.4	1,722,673	22,586,064
Connecticut	835.4	477,893	6,235,582	North Dakota	7,396.6	1,203,060	15,537,696
Delaware	485.9	365,625	3,936,558	Ohio	5,899.3	2,753,528	36,759,943
Florida	1,926.0	921,558	11,716,509	Oklahoma	5,594.3	1,751,015	23,060,616
Georgia	5,576.7	1,985,632	26,357,252	Oregon	3,239.7	1,197,667	15,640,912
Idaho	2,770.0	932,594	12,294,278	Pennsylvania	5,058.2	3,314,707	44,648,863
Illinois	6,618.5	3,100,781	42,341,582	Rhode Island	362.4	365,625	4,130,069
Indiana	4,701.5	1,909,505	25,879,131	South Carolina	3,230.0	1,065,105	14,042,597
Iowa	7,212.0	2,005,944	27,592,658	South Dakota	6,001.5	1,232,962	16,073,079
Kansas	7,917.0	2,048,585	27,702,029	Tennessee	3,252.8	1,608,802	21,725,833
Kentucky	3,710.0	1,414,610	18,884,029	Texas	11,691.0	4,545,830	58,683,271
Louisiana	2,712.9	1,040,195	13,371,889	Utah	1,686.3	850,752	11,213,122
Maine	1,443.6	675,106	9,180,660	Vermont	1,043.0	365,625	4,731,007
Maryland	1,557.1	631,911	8,460,608	Virginia	3,291.5	1,429,253	19,244,434
Massachusetts	1,308.0	1,090,022	14,466,733	Washington	2,927.5	1,156,219	14,726,242
Michigan	5,243.0	2,200,177	29,171,795	West Virginia	2,214.0	792,826	10,529,177
Minnesota	6,884.5	2,102,986	28,036,206	Wisconsin	5,193.4	1,849,169	24,877,231
Mississippi	3,632.1	1,323,897	17,380,914	Wyoming	3,097.0	942,455	12,322,181
Missouri	7,530.0	2,382,383	32,370,362	Hawaii	174.6	365,625	2,562,653
Montana	4,690.5	1,552,865	19,635,885				
Nebraska	5,468.3	1,586,526	20,978,179	Total	188,857.2	73,125,000	963,875,000
Nevada	1,541.0	960,845	12,622,940				

Bureau of Public Roads.

TABLE 571.—*Current status of Federal-aid road construction as of June 30, 1929*

State	Completed mileage	Under construction: Estimated total cost	Under construction: Federal aid allotted	Under construction: Mileage: Initial	Under construction: Mileage: Stage [1]	Under construction: Mileage: Total	Approved for construction: Estimated total cost	Approved for construction: Federal aid allotted	Approved for construction: Mileage: Initial	Approved for construction: Mileage: Stage [1]	Approved for construction: Mileage: Total	Balance of Federal-aid funds available for new projects
Alabama	1,960.7	$3,258,926.95	$1,627,437.04	224.7	21.0	245.7	$430,398.21	$215,199.10	6.4	14.3	20.7	$2,243,381.25
Arizona	887.8	2,199,816.28	1,859,989.34	100.5	30.1	130.6	226,598.57	170,606.04		29.4	29.4	2,653,890.02
Arkansas	1,745.1	3,656,725.36	1,799,403.14	102.9	6.5	109.4	529,229.73	262,782.41	25.3	6.0	31.3	2,104,522.21
California	1,625.5	9,612,659.34	4,324,210.30	265.4	9.9	275.3	2,536,332.71	1,117,206.50	31.6	19.5	51.1	821,207.18
Colorado	1,137.4	3,993,909.55	2,068,568.40	128.8	26.6	155.4	770,144.32	412,855.91	25.8	12.4	38.2	1,673,794.83
Connecticut	229.3	792,275.72	217,937.99	12.5		12.5	1,372,239.99	559,118.95	8.0		8.0	558,722.80
Delaware	212.9	753,366.80	298,843.42	15.7		15.7	535,184.40	262,260.69	30.8		30.8	47,336.16
Florida	449.0	2,734,529.08	1,135,234.01	90.9	5.7	96.6						1,965,926.62
Georgia	2,564.7	3,757,836.66	1,673,267.89	163.9	36.9	200.8	37,129.17	18,192.86	2.9		2.9	2,018,492.49
Idaho	1,144.5	905,547.56	542,064.66	77.5		77.5	202,122.35	121,880.16	16.3		16.3	856,815.71
Illinois	1,888.6	19,245,292.23	8,620,190.39	572.8		572.8	648,000.00	324,000.00	22.5		22.5	2,642,000.00
Indiana	1,266.7	8,958,464.70	4,278,868.78	275.9		275.9	1,058,051.61	504,631.00	35.3		35.3	134,519.81
Iowa	3,009.1	3,527,407.02	1,582,809.17	53.4	82.3	135.7	2,464,679.61	998,305.35	25.7	63.9	89.6	
Kansas	2,539.5	3,432,075.07	1,346,245.56	243.8		243.8	2,067,844.93	981,277.15	135.9	11.5	147.4	1,144,315.96
Kentucky	1,314.5	4,598,602.22	2,194,672.33	243.8	3.4	247.2	463,762.16	231,833.31	40.3		40.3	757,788.11
Louisiana	1,321.4	3,623,495.55	1,803,989.15	151.9		151.9	287,899.05	105,752.71	.2	8.2	8.4	1,150,105.07
Maine	480.5	1,883,862.41	646,104.12	44.3		44.3	941,331.71	381,984.35	29.7		29.7	1,111,122.42
Maryland	627.9	167,810.00	62,360.00	3.6		3.6	980,260.95	456,710.00	39.3	16.8	56.1	213,725.37
Massachusetts	570.7	5,097,641.63	1,538,226.50	91.1		91.1	258,186.27	75,125.87	1.9	3.4	5.3	1,787,319.03
Michigan	1,470.2	10,224,762.17	4,374,874.40	251.3		251.3	2,155,000.00	933,716.86	51.6	9.5	61.1	1,424,179.67
Minnesota	3,872.6	4,888,903.63	1,671,618.27	197.6	93.4	291.0	1,498,509.36	416,297.96	74.7	16.6	91.3	410,000.00
Mississippi	1,656.5	4,736,296.26	2,130,632.99	196.4	17.4	213.8	188,293.15	94,146.56	12.9		12.9	1,361,970.25
Missouri	2,278.1	9,068,176.63	3,483,757.97	211.8	56.2	268.0	3,342,376.38	1,279,693.85	16.5	91.4	107.9	136,556.02
Montana	1,538.9	5,089,960.81	3,187,267.45	354.2	8.1	362.3	1,758,524.56	967,070.97	166.0		166.0	3,613,761.84
Nebraska	3,628.2	2,892,184.38	1,438,788.31	240.5	60.2	300.7	1,558,312.11	711,443.12	54.0	134.7	188.7	2,539,681.66
Nevada	1,081.6	1,144,050.62	1,002,938.37	114.5	112.4	226.9	334,482.30	297,187.45	.6	92.4	93.0	204,689.18
New Hampshire	332.7	561,177.02	198,553.31	12.5	1.0	13.5	252,935.68	97,410.00	6.5		6.5	188,125.54
New Jersey	462.6	4,565,550.60	815,205.00	54.3		54.3	521,240.38	130,335.00	8.7		8.7	625,470.08
New Mexico	1,868.1	2,261,247.93	1,429,503.15	137.6		137.6	241,716.29	154,094.12	9.0		9.0	1,153,455.48
New York	2,182.7	23,451,671.43	5,137,430.55	343.6		343.6	9,105,046.33	2,054,505.00	137.5		137.5	4,295,740.58
North Carolina	1,712.0	1,375,152.61	687,576.28	80.4	7.2	87.6	272,103.36	131,967.67	14.2		14.2	1,721,786.21
North Dakota	3,675.8	3,234,518.96	1,329,006.06	482.5	138.2	620.7	1,143,646.71	429,101.68	124.7	231.9	356.6	982,621.03
Ohio	2,013.1	11,976,628.49	4,206,990.80	257.2		257.2	4,310,036.60	997,860.29	59.7	19.3	79.0	2,755,365.68
Oklahoma	1,823.7	1,499,899.94	668,725.70	78.8	5.8	84.6	1,392,362.75	617,562.37	38.4	17.1	55.5	913,425.83
Oregon	1,147.9	793,251.14	391,848.56	48.2		48.2	1,137,687.38	708,004.14	72.9	44.8	117.7	1,430,698.62
Pennsylvania	2,072.9	12,854,654.57	3,395,873.25	202.5	14.1	216.6	3,619,350.36	1,267,978.20	81.9		81.9	1,855,478.52
Rhode Island	165.2	1,562,040.98	403,211.55	23.9		23.9	70,170.40	22,755.00	1.5		1.5	548,347.68
South Carolina	1,813.8	4,080,278.30	823,426.61	128.9	37.4	166.3	368,829.54	85,000.00	14.2		14.2	886,629.83
South Dakota	3,310.8	3,727,628.20	2,010,354.66	488.6	47.7	536.3	440,580.75	232,278.85	49.0	28.6	77.6	371,595.94

Tennessee	1, 148. 4	3, 605, 466. 41	1, 672, 582. 01	119. 8	----------	119. 8	342, 937. 22	171, 468. 59	15. 9	----------	15. 9	1, 096, 306. 59
Texas	6, 064. 2	17, 723, 807. 68	7, 610, 655. 50	657. 9	253. 2	911. 1	7, 000, 086. 00	2, 998, 213. 00	173. 2	139. 1	312. 3	36, 517. 80
Utah	918. 3	1, 727, 297. 51	1, 165, 860. 46	68. 0	----------	68. 0	246, 869. 73	182, 643. 58	18. 4	----------	18. 4	361, 621. 97
Vermont	229. 0	1, 889, 278. 37	632, 504. 02	38. 1	----------	38. 1	20, 051. 36	10, 025. 68	. 1	----------	. 1	62, 786. 68
Virginia	1, 345. 8	2, 754, 082. 68	1, 196, 688. 51	95. 3	18. 9	114. 2	476, 187. 94	201, 193. 99	22. 1	3. 1	25. 2	758, 318. 82
Washington	854. 4	3, 721, 579. 95	1, 228, 875. 25	73. 1	18. 1	91. 2	1, 039, 326. 93	480, 000. 00	21. 9	11. 7	33. 6	917, 100. 03
West Virginia	683. 3	2, 842, 654. 78	1, 149, 762. 08	68. 9	17. 8	86. 7	1, 323, 627. 44	515, 302. 72	24. 8	12. 3	37. 1	77, 371. 86
Wisconsin	2, 056. 1	9, 777, 590. 68	4, 308, 468. 14	307. 1	29. 3	336. 4	754, 725. 77	363, 097. 16	38. 9	----------	38. 9	338, 759. 36
Wyoming	1, 674. 6	1, 526, 197. 61	979, 518. 74	155. 1	8. 9	164. 0	213, 573. 07	140, 210. 67	28. 7	27. 4	56. 1	313, 862. 69
Hawaii	39. 5	402, 261. 10	137, 426. 82	6. 6	----------	6. 6	562, 688. 38	247, 259. 61	16. 6	----------	16. 6	1, 072, 664. 16
Total	78, 096. 6	38, 158, 495. 57	96, 500, 346. 96	8, 358. 6	1, 167. 7	9, 526. 3	61, 500, 673. 97	24, 137, 546. 45	1, 833. 0	1, 065. 3	2, 898. 3	56, 339, 874. 64

Bureau of Public Roads.

[1] The term stage construction refers to additional work done on projects previously improved with Federal aid. In general, such additional work, consists of the construction of a surface of higher type than was provided in the initial improvement.

TABLE 572.—*Mileage of roads in State highway systems at end of 1928, as reported by State highway departments*

State	Total system mileage	Earth, non-surfaced		Surfaced roads, by types								
		Unimproved	Improved to grade	Total surfaced mileage	Sand-clay, topsoil	Gravel, chert, etc.	Waterbound macadam (treated and untreated)	Bituminous macadam	Sheet asphalt	Bituminous concrete	Portland cement concrete	Brick and block
Alabama	5, 590	2, 450	400	2, 740	800	1, 468	46	63	6	118	239	
Arizona	2, 213	336	291	1, 586	27	1, 356			15	51	137	
Arkansas	8, 718	1, 499	2, 303	4, 916		4, 072	168	147	32	209	288	
California	6, 572	2, 057	588	3, 927		1, 351	61	325	397	136	1, 657	
Colorado	9, 120	4, 223	742	4, 155	82	3, 730				13	330	
Connecticut	2, 013		107	1, 906		319	774	268		152	392	1
Delaware	703			703		23	5	29	19	13	607	7
Florida	6, 414	2, 727	453	3, 234	715	8	1, 484	149	204	52	334	288
Georgia	6, 253	2, 156	321	3, 776	1, 844	772	171	274	116	17	581	1
Idaho	4, 259	1, 419	468	2, 372	32	2, 126		21	5	132	56	
Illinois	9, 889	3, 363	274	6, 252			1	4	10	7	6, 111	119
Indiana	4, 610		18	4, 592		1, 580	943	358		32	1, 597	82
Iowa	7, 184	899	1, 114	5, 171		3, 423					1, 715	33
Kansas	8, 691	4, 042	1, 920	2, 729	1, 307	433		159		3	649	178
Kentucky	11, 500	5, 521	842	5, 137		1, 969	2, 398	428		21	295	26
Louisiana	9, 053	2, 509	257	6, 287		6, 082		16	1	123	50	15
Maine	1, 911	230		1, 681	4	1, 335	7	235			100	
Maryland	2, 656			2, 656		398	1, 131			53	1, 030	1
Massachusetts	1, 587		8	1, 579		91	245	771	43	213	256	3
Michigan	7, 613	739	104	6, 770	96	3, 479	569	128		266	2, 221	11
Minnesota	6, 947		331	6, 616	281	5, 298				77	936	24
Mississippi	6, 939	1, 794	609	4, 536	1	4, 071	11	51	8	14	360	20
Missouri	7, 527	2, 000	1, 259	4, 268		2, 420		94			1, 733	21
Montana	8, 007	6, 404	249	1, 354		1, 305		5		7	37	
Nebraska	8, 012	3, 334	801	3, 877	154	3, 561			3	13	95	51
Nevada	3, 554	1, 992	131	1, 431		1, 231		147		2	51	
New Hampshire	2, 365	103	98	2, 164		1, 759	112	167		71	55	
New Jersey	1, 821	5	135	1, 681		286	131	30	91	278	814	51
New Mexico	9, 354	6, 355	989	2, 010		1, 936				1	73	
New York	13, 917	3, 331	25	10, 561		126	1, 988	3, 794		265	4, 115	273
North Carolina	7, 137		747	6, 390	2, 252	359	205	458	66	854	2, 155	41
North Dakota	7, 205	3, 342	1, 618	2, 245		2, 235			1		9	
Ohio	10, 953	250	206	10, 497		3, 837	1, 496	1, 716	39	174	1, 812	1, 423
Oklahoma	6, 142	2, 737	1, 410	1, 995		939			21	187	812	36
Oregon	4, 368	644	234	3, 490		2, 483		112		687	208	
Pennsylvania	13, 330		4, 164	9, 166		1, 513	2, 272	410	193	327	4, 068	383
Rhode Island	920	225	183	512		23	116	157	11	115	90	
South Carolina	5, 810	1, 042	111	4, 657	3, 322	529	38	11	136	179	442	
South Dakota	5, 975	995	1, 567	3, 413	20	3, 378		6			9	
Tennessee	5, 870	940	396	4, 534		2, 133	1, 225	596	35	80	465	
Texas	18, 728	6, 855	1, 124	10, 749	237	6, 122	521	2, 405	17	223	1, 141	83
Utah	3, 458	591	1, 224	1, 643		1, 291	68	5	12	52	215	
Vermont	4, 204	62	758	3, 384	1, 000	2, 116	49	68			151	
Virginia	6, 932	1, 655	555	4, 722	1, 279	845	1, 206	713	10	3	666	
Washington	3, 262	334	194	2, 734		1, 983		32	2	43	662	12
West Virginia	3, 820	568	860	2, 392		703	149	723	1	90	585	141
Wisconsin	10, 221	643	936	8, 642	46	5, 360	552	125	4	12	2, 541	2
Wyoming	3, 115	1, 178	631	1, 306		1, 267				27	12	
Total, 1928	306, 442	81, 549	31, 755	193, 138	13, 499	93, 124	18, 142	15, 200	1, 498	5, 392	42, 957	3, 326
Total:												
1927	293, 353	86, 817	29, 970	176, 566	12, 581	86, 095	17, 752	13, 496	1, 332	5, 066	36, 915	3, 329
1926	287, 928	96, 413	28, 456	163, 059	11, 396	79, 286	18, 428	12, 927	890	4, 815	31, 936	3, 381
1925	274, 911	103, 271	26, 786	144, 854	11, 025	68, 771	16, 709	12, 105	853	4, 561	27, 645	3, 185
1924	261, 216	94, 651	34, 456	132, 109	10, 446	63, 158	17, 033	10, 346	784	4, 427	22, 825	3, 090
1923	251, 611	103, 843	36, 368	111, 409	8, 875	52, 917	15, 422	8, 847	651	3, 907	17, 916	2, 865
1921	209, 242	102, 963	21, 421	[1] 84, 858	8, 622	36, 458	16, 978	6, 749	396	2, 444	10, 114	2, 089

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[1] Includes 1,008 miles of miscellaneous surfacing not allocated by types.

TABLE 573.—*Total State highway income and funds available, 1928, as reported by State authorities*

State	Total funds available	Balances at first of year	Total income for State highways	State taxes and appropriations	Motor vehicle fees	Gasoline-tax receipts	From counties and miscellaneous	State highway bonds sold	Federal aid road funds used
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	21,023	1,934	19,089	--------	2,635	3,194	197	10,085	2,978
Arizona	3,169	−172	3,341	1,386	488	1,039	6	--------	422
Arkansas	36,314	7,632	28,682	--------	3,786	5,383	221	18,173	1,119
California	38,535	7,070	31,465	4,764	3,695	19,339	1,210	--------	2,457
Colorado	8,476	1,845	6,631	1,360	835	2,666	40	--------	1,730
Connecticut	22,994	10,214	12,780	1,583	6,797	3,107	877	--------	416
Delaware	3,612	252	3,360	--------	928	789	446	987	210
Florida	14,686	592	14,094	5	3,429	6,771	3,017	--------	872
Georgia	13,169	251	12,918	--------	3,910	5,151	1,957	--------	1,900
Idaho	5,447	720	4,727	308	189	2,006	979	--------	1,245
Illinois	57,398	2,440	54,958	297	15,070	--------	380	35,156	4,055
Indiana	18,488	2,415	16,073	--------	5,435	7,287	695	--------	2,656
Iowa	43,640	5,659	37,981	--------	10,037	4,785	138	20,189	2,832
Kansas	13,904	2	13,902	150	3,151	4,256	4,057	--------	2,288
Kentucky	14,871	658	14,213	906	3,700	4,675	2,924	--------	2,008
Louisiana	12,753	2,243	10,510	--------	4,382	3,278	1,896	--------	954
Maine	13,432	1,262	12,170	2,577	2,715	3,209	2,553	874	242
Maryland	12,546	2,112	10,434	50	1,962	4,360	2,092	1,239	731
Massachusetts	17,510	669	16,841	993	12,179	--------	2,703	--------	966
Michigan	40,954	1,535	39,419	--------	18,616	16,329	2,105	--------	2,369
Minnesota	29,664	8,903	20,761	1,922	10,066	5,590	942	--------	2,241
Mississippi	7,302	1,079	6,223	--------	214	2,582	1,916	--------	1,511
Missouri	23,340	4,843	18,497	97	8,701	6,785	531	--------	2,383
Montana	4,082	252	3,830	--------	--------	1,743	342	--------	1,745
Nebraska	7,384	245	7,139	100	1,150	3,932	141	--------	1,816
Nevada	2,191	−44	2,235	8	249	260	577	100	1,041
New Hampshire	6,888	1,319	5,569	--------	1,906	1,413	1,877	--------	373
New Jersey	39,729	10,136	29,593	2,625	12,248	8,362	616	5,010	732
New Mexico	7,598	307	7,291	717	372	1,960	270	2,153	1,819
New York	106,825	44,586	62,239	29,455	20,000	--------	9,149	--------	3,635
North Carolina	42,293	9,912	32,381	1,250	9,566	9,377	472	10,000	1,716
North Dakota	3,775	236	3,539	170	729	1,460	29	--------	1,151
Ohio	37,264	955	36,309	175	6,077	15,472	11,238	--------	3,347
Oklahoma	13,488	456	13,032	--------	2,600	4,850	3,894	--------	1,688
Oregon	11,038	1,023	10,015	--------	4,927	3,658	848	--------	582
Pennsylvania	80,054	24,147	55,907	15	27,213	18,760	6,098	--------	3,821
Rhode Island	7,724	3,363	4,361	9	2,296	1,299	76	256	425
South Carolina	27,800	9,194	18,606	--------	2,367	3,285	11,820	--------	1,134
South Dakota	6,001	6	5,995	634	1,456	2,278	61	--------	1,566
Tennessee	24,838	−165	25,003	2	3,957	4,638	7,234	8,011	1,161
Texas	39,290	5,860	33,430	--------	9,959	14,408	4,786	--------	4,277
Utah	4,717	92	4,625	--------	413	2,217	889	--------	1,106
Vermont	10,005	96	9,909	711	2,034	972	498	5,000	694
Virginia	16,401	974	15,427	2,056	5,051	5,546	1,335	--------	1,439
Washington	13,893	--------	13,893	--------	6,281	4,172	2,060	--------	1,380
West Virginia	18,668	4,524	14,144	--------	4,396	4,243	40	4,250	1,215
Wisconsin	26,254	4,003	22,251	--------	10,403	6,326	2,563	--------	2,959
Wyoming	4,059	525	3,534	99	565	952	527	--------	1,391
Total	1,035,486	186,160	849,326	54,424	259,135	234,164	99,322	121,483	80,798

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TABLE 574.—*Total State highway road and bridge disbursements, 1928, as reported by State authorities*

State	Grand total disbursements	Expenditure for state highway purposes						Other disbursements by State highway department	
		Total expenditure for State highways	Construction and right of way	Maintenance	Miscellaneous expenses	Equipment material, etc.	Interest on bonds	Retirement of bonds	County fund transfers
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	20, 110	19, 291	15, 082	759	39	2, 154	1, 257	819	--------
Arizona	2, 443	2, 443	1, 001	869	330	243	--------	--------	--------
Arkansas	31, 784	23, 812	20, 268	2, 174	255	254	861	6, 504	1, 468
California	24, 965	23, 190	14, 507	5, 128	--------	566	2, 989	1, 775	--------
Colorado	6, 957	6, 357	4, 444	949	7	516	441	600	--------
Connecticut	16, 419	16, 419	12, 435	3, 890	94	--------	--------	--------	--------
Delaware	3, 377	3, 089	1, 857	205	185	--------	842	288	--------
Florida	14, 343	14, 343	12, 428	1, 538	151	226	--------	--------	--------
Georgia	12, 728	12, 728	10, 864	1, 284	14	566	--------	--------	--------
Idaho	5, 413	5, 274	4, 096	796	156	88	138	139	--------
Illinois	53, 472	51, 473	44, 279	2, 409	428	207	4, 150	1, 999	--------
Indiana	16, 544	16, 544	12, 495	3, 218	--------	831	--------	--------	--------
Iowa	37, 255	34, 398	29, 509	3, 810	220	--------	859	638	2, 219
Kansas	13, 904	13, 904	10, 961	2, 385	--------	558	--------	--------	--------
Kentucky	14, 766	14, 261	12, 207	1, 515	17	385	137	--------	505
Louisiana	11, 157	10, 686	7, 138	2, 506	249	669	124	457	14
Maine	11, 052	10, 571	7, 463	1, 793	245	506	564	481	--------
Maryland	10, 668	10, 668	5, 689	4, 860	119	--------	--------	--------	--------
Massachusetts	16, 478	13, 801	10, 744	1, 907	80	145	925	--------	2, 677
Michigan	36, 578	24, 098	15, 232	5, 519	655	443	2, 249	2, 667	9, 813
Minnesota	18, 412	18, 251	11, 053	4, 724	--------	880	1, 594	161	--------
Mississippi	6, 281	6, 281	3, 395	2, 548	127	211	--------	--------	--------
Missouri	18, 981	17, 981	12, 693	2, 572	133	471	2, 112	1, 000	--------
Montana	3, 863	3, 863	3, 328	410	--------	125	--------	--------	--------
Nebraska	6, 984	6, 984	4, 971	1, 906	--------	107	--------	--------	--------
Nevada	2, 167	2, 067	1, 362	390	52	235	28	100	--------
New Hampshire	5, 553	5, 469	2, 534	2, 609	55	271	--------	--------	84
New Jersey	32, 479	31, 700	26, 144	5, 126	22	3	405	719	60
New Mexico	6, 603	5, 947	4, 199	1, 083	--------	566	99	656	--------
New York	62, 503	56, 618	42, 513	9, 878	27	--------	4, 200	400	5, 485
North Carolina	28, 301	24, 675	14, 580	4, 506	868	--------	4, 721	--------	3, 626
North Dakota	3, 564	3, 564	2, 680	749	39	96	--------	--------	--------
Ohio	33, 953	33, 953	21, 216	11, 625	890	222	--------	--------	--------
Oklahoma	13, 251	13, 251	10, 207	2, 780	242	22	--------	--------	--------
Oregon	10, 268	8, 518	3, 421	3, 323	188	--------	1, 586	1, 750	--------
Pennsylvania	56, 616	51, 850	22, 076	17, 570	3, 733	4, 180	4, 291	2, 747	2, 019
Rhode Island	4, 548	4, 454	2, 111	1, 818	57	282	186	64	30
South Carolina	21, 099	18, 976	16, 284	2, 151	1	540	--------	--------	2, 123
South Dakota	5, 893	5, 893	3, 551	1, 974	357	7	4	--------	--------
Tennessee	19, 172	19, 172	12, 815	4, 899	98	1, 198	162	--------	--------
Texas	28, 710	28, 710	14, 434	12, 327	369	1, 580	--------	--------	--------
Utah	3, 992	3, 579	2, 082	815	100	257	325	413	--------
Vermont	5, 762	5, 762	3, 913	1, 525	--------	324	--------	--------	--------
Virginia	14, 448	14, 238	10, 487	3, 514	79	--------	158	--------	210
Washington	13, 893	11, 833	8, 853	2, 826	--------	154	--------	--------	2, 030
West Virginia	16, 224	13, 567	7, 539	2, 996	508	388	2, 136	2, 640	17
Wisconsin	20, 017	16, 542	12, 637	3, 742	144	19	--------	--------	3, 475
Wyoming	3, 600	3, 600	2, 517	979	--------	10	94	--------	--------
Total	827, 550	764, 648	536, 294	158, 879	11, 333	20, 505	37, 637	27, 017	35, 885

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TABLE 575.—*Mileage of county and local roads at end of 1928, from records and reports of local authorities*

State	Total mileage, local roads	Earth, nonsurfaced	Surfaced roads, by types								
			Total surfaced mileage	Sand-clay top-soil	Gravel, chert, etc.	Water-bound macadam (treated and untreated)	Bituminous macadam	Sheet asphalt	Bituminous concrete	Portland cement concrete	Brick and block
Alabama	61, 004	46, 374	14, 630	7, 433	6, 791	263	44	10	59	24	6
Arizona	19, 636	17, 801	1, 835	334	1, 133	25	------	55	13	275	------
Arkansas	66, 039	64, 176	1, 863	210	1, 594	46	7	1	------	5	------
California	73, 032	51, 879	21, 153	1, 599	12, 779	1, 155	2, 334	16	1, 084	2, 186	------
Colorado	59, 185	56, 388	2, 797	1, 392	1, 399	------	------	------	2	4	------
Connecticut	12, 022	10, 478	1, 544	------	989	378	83	7	------	85	2
Delaware	3, 094	2, 703	391	------	151	194	21	------	20	4	1
Florida	23, 326	12, 542	10, 784	3, 453	922	4, 966	169	624	68	83	499
Georgia	93, 284	83, 088	10, 196	8, 348	1, 268	76	250	51	------	201	2
Idaho	34, 834	28, 719	6, 115	1, 769	4, 281	------	19	------	41	5	------
Illinois	87, 730	73, 950	13, 780	------	11, 828	450	80	23	------	128	118
Indiana	68, 999	22, 596	46, 403	------	42, 991	1, 527	324	19	180	1, 211	151
Iowa	96, 523	86, 503	10, 020	------	10, 007	------	------	------	------	13	------
Kansas	123, 554	121, 698	1, 856	600	1, 100	65	40	7	1	41	2
Kentucky	49, 761	38, 768	10, 993	163	3, 901	6, 839	61	2	5	22	------
Louisiana	26, 440	21, 996	4, 444	60	4, 360	11	5	------	7	1	------
Maine	19, 091	15, 479	3, 612	9	3, 572	13	15	------	------	3	------
Maryland	12, 079	9, 242	2, 837	157	1, 616	946	8	4	------	106	------
Massachusetts	17, 354	10, 150	7, 204	64	4, 722	777	1, 212	11	348	61	9
Michigan	73, 402	56, 005	17, 397	19	14, 478	1, 389	163	6	78	1, 259	5
Minnesota	103, 500	75, 893	27, 607	5, 761	21, 598	110	------	12	19	107	------
Mississippi	50, 733	41, 120	9, 613	204	9, 152	32	46	8	71	95	5
Missouri	103, 065	95, 014	8, 051	1, 462	5, 105	1, 280	93	------	51	60	------
Montana	58, 924	57, 100	1, 824	120	1, 700	2	2	------	------	------	------
Nebraska	85, 900	85, 126	774	243	485	4	2	------	9	29	2
Nevada	19, 488	18, 908	580	23	551	------	6	------	------	------	------
New Hampshire	9, 663	9, 281	382	24	324	22	11	------	1	------	------
New Jersey	15, 201	8, 148	7, 053	166	3, 507	1, 249	520	364	534	657	56
New Mexico	38, 978	38, 627	351	86	265	------	------	------	------	------	------
New York	66, 190	45, 638	20, 552	------	7, 055	7, 225	5, 247	------	------	1, 025	------
North Carolina	64, 392	42, 437	21, 955	18, 216	2, 773	276	279	90	30	266	25
North Dakota	99, 634	98, 926	708	------	708	------	------	------	------	------	------
Ohio	74, 046	38, 298	35, 748	------	26, 405	5, 917	2, 402	37	78	646	263
Oklahoma	114, 485	112, 769	1, 716	219	1, 374	1	12	8	6	96	------
Oregon	47, 265	38, 760	8, 505	234	6, 644	1, 100	9	------	362	156	------
Pennsylvania	77, 366	61, 631	15, 735	------	11, 858	1, 920	515	66	424	534	418
Rhode Island	1, 679	1, 201	478	------	248	117	92	16	------	2	3
South Carolina	51, 283	39, 292	11, 991	11, 248	658	7	6	------	50	19	3
South Dakota	114, 299	112, 872	1, 427	------	1, 427	------	------	------	------	------	------
Tennessee	59, 193	50, 189	9, 004	236	5, 200	3, 446	43	6	8	64	1
Texas	169, 836	155, 370	14, 466	2, 634	11, 100	467	40	26	20	179	------
Utah	19, 979	17, 626	2, 353	30	2, 248	------	2	------	30	43	------
Vermont	10, 837	9, 364	1, 473	144	1, 325	------	1	3	------	------	------
Virginia	52, 766	45, 591	7, 175	3, 750	1, 640	1, 310	340	------	------	135	------
Washington	40, 633	26, 961	13, 672	975	10, 025	1, 704	44	------	124	758	42
West Virginia	30, 979	29, 454	1, 525	------	491	298	406	------	40	222	68
Wisconsin	71, 068	52, 939	18, 129	3, 080	13, 848	847	------	------	------	354	------
Wyoming	38, 068	37, 770	298	97	201	------	------	------	------	------	------
Total, 1928	2, 709, 839	2, 276, 840	432, 999	74, 562	277, 797	46, 454	14, 953	1, 472	3, 768	12, 317	1, 681
Total: 1927	2, 720, 231	2, 308, 076	412, 155	71, 770	263, 088	45, 500	13, 525	1, 454	3, 680	11, 438	1, 700
1926	2, 712, 262	2, 325, 257	387, 005	69, 711	245, 524	42, 732	11, 651	1, 548	3, 607	10, 405	1, 827
1925	2, 731, 172	2, 354, 766	[1] 376, 406	58, 211	224, 036	65, 604	10, 490	1, 921	3, 420	10, 106	2, 059
1924	2, 743, 195	2, 403, 637	[2] 339, 558	53, 638	193, 465	60, 139	7, 853	1, 489	2, 991	8, 363	1, 624
1923	2, 744, 116	2, 416, 175	[3] 327, 941	52, 425	186, 314	59, 200	6, 950	1, 395	2, 824	7, 289	1, 569
1921	2, 732, 052	2, 429, 150	[4] 302, 902	54, 717	163, 441	60, 367	3, 515	1, 205	2, 534	5, 497	1, 331

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[1] Includes 559 miles of miscellaneous types.
[2] Includes 9,996 miles of miscellaneous types.
[3] Includes 9,975 miles of miscellaneous types.
[4] Includes 10,295 miles of miscellaneous types.

TABLE 576.—*Local road income and funds available, 1928, compiled from records of local authorities*

State	Total funds available	Balance at first of year	Total income for local roads	Local road bond sales	Local road taxes and appropriations	Motor-vehicle fees	Gasoline tax receipts	Funds from State for local roads	Miscellaneous income
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	13, 565	1, 473	12, 092	1, 713	5, 480	53	3, 353		1, 493
Arizona	2, 088	150	1, 938	103	895		672	155	113
Arkansas	8, 920	786	8, 134		2, 150	2, 423	3, 445		116
California	51, 922	13, 067	38, 855	7, 028	18, 899	3, 192	8, 860	154	722
Colorado	4, 758	349	4, 409		2, 445	448	785	544	187
Connecticut	3, 193		3, 193		3, 193				
Delaware	1, 909	275	1, 634	350	923			269	92
Florida	46, 694	21, 739	24, 955	5, 383	15, 174	916	2, 260		1, 222
Georgia	18, 184	2, 215	15, 969	2, 434	11, 038		2, 158		339
Idaho	8, 802	2, 406	6, 396	451	3, 463	1, 375			1, 107
Illinois	31, 755	1, 651	30, 104	1, 197	28, 248				659
Indiana	52, 682	10, 775	41, 907	11, 517	27, 597		2, 790		3
Iowa	28, 180	3, 576	24, 604	1, 429	15, 382		3, 674	1, 287	2, 832
Kansas	27, 614	7, 306	20, 308	1, 543	14, 040		2, 785		1, 940
Kentucky	10, 195		10, 195	3, 462	6, 102	369			262
Louisiana	16, 820	7, 089	9, 731	480	8, 409				842
Maine	2, 762	39	2, 801	40	2, 661				100
Maryland	4, 916		4, 916	1, 310	3, 277				329
Massachusetts	14, 047	134	13, 913	204	11, 095			2, 372	242
Michigan	64, 984	14, 245	50, 739	8, 240	29, 394	6, 000	3, 363	2, 037	1, 705
Minnesota	25, 018	1, 119	23, 899	1, 015	18, 542			2, 862	1, 480
Mississippi	37, 634	8, 802	28, 832	8, 511	12, 270	2, 430	2, 748		2, 873
Missouri	15, 587	1, 500	14, 087	2, 274	9, 423				2, 390
Montana	5, 853	1, 218	4, 635	120	2, 970	1, 250		75	220
Nebraska	10, 194	1, 262	8, 932		5, 901	2, 703			328
Nevada	1, 634	524	1, 110	6	767	20	252	51	14
New Hampshire	3, 903		3, 903		3, 810			84	9
New Jersey	27, 120	2, 834	24, 286	5, 415	13, 446	2, 879		1, 642	904
New Mexico	542	82	460		285	155		8	12
New York	52, 384	4, 291	48, 093		28, 979	5, 197		5, 485	8, 432
North Carolina	31, 983	1, 750	30, 233	10, 040	13, 297			3, 626	3, 270
North Dakota	6, 380	1, 769	4, 611		3, 874	737			
Ohio	81, 582	12, 000	69, 582	17, 150	42, 800	5, 484	4, 148		
Oklahoma	18, 200	1, 732	16, 468	1, 200	8, 000	3, 755	2, 716		797
Oregon	14, 470	1, 720	12, 750	3, 750	5, 300	1, 510	190	1, 150	850
Pennsylvania	81, 259	16, 864	64, 395	15, 502	35, 249		3, 664	3, 852	6, 128
Rhode Island	1, 004	22	982	38	806				138
South Carolina	17, 046	1, 411	15, 635	8, 574	3, 751		2, 170		1, 140
South Dakota	7, 189		7, 189		5, 535	1, 392		108	154
Tennessee	26, 017	10, 812	15, 205	5, 928	7, 724	125			1, 428
Texas	44, 400	5, 300	39, 100	14, 000	17, 700	7, 200			200
Utah	2, 261	672	1, 589		1, 493				96
Vermont	1, 040		1, 040		740			300	
Virginia	13, 888	3, 658	10, 230	1, 376	4, 540		2, 192	210	1, 912
Washington	10, 506	756	9, 750	110	7, 120	820	120	780	800
West Virginia	18, 694	3, 500	15, 194	3, 742	11, 322				130
Wisconsin	37, 561	2, 102	35, 459	4, 587	22, 509		1, 434	3, 934	2, 995
Wyoming	885		885		744			12	129
Total	1, 008, 224	172, 897	835, 327	150, 222	498, 762	50, 433	53, 779	30, 997	51, 134

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TABLE 577.—*Local road disbursements, 1928, compiled from records of local authorities*

State	Total disbursements	Expenditures for local road purposes					Other disbursements by local authorities	
		Total expenditures for local roads	Construction	Maintenance	Miscellaneous and overhead [1]	Interest on bonds	Principal payments on bonds	Fund transfers to State [2]
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	11, 425	8, 797	1, 898	5, 128	300	1, 471	1, 843	785
Arizona	1, 953	1, 716	344	870	315	187	191	46
Arkansas	8, 330	5, 884	760	2, 740	62	2, 322	2, 446	----------
California	37, 733	34, 513	15, 682	14, 452	1, 776	2, 603	2, 822	398
Colorado	4, 924	4, 884	1, 165	2, 865	852	2	----------	40
Connecticut	3, 132	3, 132	601	2, 531	----------	----------	----------	----------
Delaware	1, 509	1, 275	613	573	89	----------	225	9
Florida	32, 449	30, 213	13, 166	5, 518	2, 290	9, 239	2, 236	----------
Georgia	16, 471	13, 897	3; 905	7, 800	656	1, 536	863	1, 711
Idaho	6, 334	4, 852	1, 176	1, 254	1, 411	1, 011	598	884
Illinois	30, 203	28, 276	8, 834	17, 558	847	1, 037	1, 927	----------
Indiana	42, 027	29, 521	11, 551	13, 241	783	3, 946	12, 265	241
Iowa	24, 769	23, 519	9, 205	12, 648	766	900	1, 250	----------
Kansas	21, 239	15, 732	7, 128	6, 004	1, 400	1, 200	1, 457	4, 050
Kentucky	9, 831	5, 910	1, 076	3, 478	449	907	988	2, 933
Louisiana	12, 464	7, 395	1, 294	2, 730	452	2, 919	2, 385	2, 684
Maine	2, 800	2, 738	350	2, 228	100	60	62	----------
Maryland	4, 988	3, 711	1, 284	1, 869	173	385	258	1, 019
Massachusetts	13, 485	12, 456	5, 376	6, 289	702	89	590	439
Michigan	51, 523	43, 083	24, 023	17, 362	----------	1, 698	8, 440	----------
Minnesota	24, 165	23, 155	15, 000	4, 872	2, 137	1, 146	1, 010	----------
Mississippi	24, 265	19, 062	6, 837	8, 029	866	3, 330	3, 227	1, 976
Missouri	12, 787	11, 163	4, 344	4, 828	1, 435	556	1, 624	----------
Montana	5, 080	4, 265	1, 200	2, 250	275	540	750	65
Nebraska	9, 269	9, 027	4, 896	3, 305	625	201	100	142
Nevada	1, 009	626	192	314	58	62	109	274
New Hampshire	3, 963	2, 258	149	1, 693	416	----------	----------	1, 645
New Jersey	25, 820	22, 096	13, 490	6, 522	216	1, 868	3, 724	----------
New Mexico	473	460	67	330	58	5	----------	13
New York	48, 437	48, 277	26, 222	15, 298	3, 498	3, 259	160	----------
North Carolina	29, 005	19, 614	6, 290	5, 070	1, 514	6, 740	9, 196	195
North Dakota	4, 372	4, 312	3, 668	550	82	12	60	----------
Ohio	69, 611	40, 156	21, 187	13, 469	----------	5, 500	18, 900	10, 555
Oklahoma	16, 930	12, 057	2, 727	7, 500	800	1, 030	1, 000	3, 873
Oregon	12, 860	11, 610	7, 300	2, 800	410	1, 100	1, 250	----------
Pennsylvania	60, 818	43, 133	20, 892	12, 195	4, 678	5, 368	8, 397	9, 288
Rhode Island	1, 002	923	291	509	80	43	79	----------
South Carolina	15, 017	6, 348	1, 312	3, 078	184	1, 774	1, 153	7, 516
South Dakota	8, 031	7, 877	4, 681	2, 726	460	10	140	14
Tennessee	18, 627	9, 325	2, 185	4, 004	426	2, 710	726	8, 576
Texas	33, 000	22, 500	5, 200	9, 650	950	6, 700	6, 000	4, 500
Utah	1, 564	1, 306	427	643	148	88	105	153
Vermont	1, 040	840	390	450	----------	----------	----------	200
Virginia	10, 092	8, 784	2, 564	4, 897	----------	1, 323	1, 183	125
Washington	9, 804	9, 004	3, 850	3, 950	410	794	800	----------
West Virginia	13, 664	11, 932	6, 962	2, 816	9	2, 145	1, 732	----------
Wisconsin	32, 981	26, 709	10, 268	10, 350	4, 136	1, 955	986	5, 286
Wyoming	927	899	293	517	53	36	25	3
Total	832, 142	659, 222	282, 315	259, 753	37, 347	79, 807	103, 282	69, 638

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[1] Administration and engineering included.
[2] Not applicable to local road and bridge disbursements.

TABLE 578.—*Motor-vehicle registration, 1928, as reported by State authorities*

State	Registered motor vehicles (private and commercial)			Registered motor cycles	Tax exempt motor cars	Number licenses and permits		Year's increase in registration	
	All motor cars and trucks	Passenger autos, taxis, and busses	Motor trucks and road tractors			Dealers' licenses	Operators' and chauffeurs' permits	Number	Per cent
Alabama	269, 519	235, 026	34, 493	611	833	586	1, 097	25, 980	10. 7
Arizona	94, 372	86, 036	8, 336	281	1, 161	1, 039	12, 342	13, 325	16. 4
Arkansas	214, 931	181, 280	33, 651	342	890	508	4, 085	8, 363	4. 0
California	1, 799, 890	1, 582, 477	217, 413	9, 449	14, 743	--------	263, 346	106, 695	6. 3
Colorado	284, 867	260, 906	23, 961	1, 234	283	3, 547	7, 977	16, 375	6. 1
Connecticut	309, 792	261, 091	48, 701	2, 497	1, 994	3, 751	337, 623	28, 271	10. 0
Delaware [2]	51, 210	41, 195	10, 015	345	44	610	56, 923	4, 086	8. 7
Florida	352, 961	296, 691	56, 270	1, 127	3, 727	2, 047	2, 853	−41, 773	−10. 6
Georgia	318, 856	277, 881	40, 975	1, 078	934	1, 155	2, 301	18, 221	6. 1
Idaho	108, 154	96, 960	11, 194	406	1, 334	458	395	6, 818	6. 7
Illinois [2]	1, 504, 359	1, 314, 003	190, 356	5, 826	979	4, 548	94, 169	65, 374	4. 5
Indiana	823, 806	706, 713	117, 093	3, 124	7, 715	2, 716	39, 021	10, 169	1. 2
Iowa	733, 466	672, 447	61, 019	1, 728	3, 244	2, 439	16, 563	29, 263	4. 2
Kansas [2]	533, 799	471, 897	61, 902	1, 199	2, 655	2, 676	----------	31, 898	6. 4
Kentucky	304, 231	272, 636	31, 595	742	2, 000	1, 138	9, 146	18, 610	6. 5
Louisiana	264, 293	223, 445	40, 848	625	209	489	16, 029	9, 293	3. 6
Maine	172, 638	139, 460	33, 178	1, 219	1, 390	1, 155	203, 353	9, 015	5. 5
Maryland	285, 311	275, 221	10, 090	2, 232	3, 469	5, 853	76, 569	8, 448	3. 1
Massachusetts	726, 295	637, 153	89, 142	6, 856	556	2, 370	870, 160	32, 188	4. 6
Michigan [2]	1, 249, 221	1, 084, 615	164, 606	3, 686	371	2, 192	311, 413	94, 448	8. 2
Minnesota	673, 573	583, 789	89, 784	2, 083	1, 405	2, 144	----------	26, 891	4. 2
Mississippi	246, 242	214, 754	31, 488	69	74	660	----------	28, 199	12. 9
Missouri	712, 965	636, 717	76, 248	1, 821	1, 783	2, 572	29, 222	30, 546	4. 5
Montana	126, 035	104, 231	21, 804	185	1, 471	512	210	13, 300	11. 8
Nebraska	391, 355	358, 173	33, 182	1, 026	1, 514	3, 344	----------	17, 443	4. 7
Nevada	27, 376	21, 733	5, 643	94	484	115	----------	1, 600	6. 2
New Hampshire	102, 644	88, 594	14, 050	1, 330	22	--------	----------	6, 635	6. 9
New Jersey	758, 430	629, 748	128, 682	6, 633	7, 071	3, 176	1, 186, 736	46, 034	6. 5
New Mexico	65, 737	63, 743	1, 994	248	901	201	----------	6, 446	10. 9
New York	2, 083, 942	1, 760, 549	323, 393	14, 594	15, 819	4, 852	2, 494, 156	146, 024	7. 5
North Carolina	464, 376	418, 864	45, 512	1, 244	6, 629	1, 103	----------	33, 877	7. 9
North Dakota	173, 525	151, 778	21, 747	236	3	--------	----------	12, 824	8. 1
Ohio	1, 649, 699	1, 450, 994	198, 705	9, 472	12, 459	3, 967	4, 419	78, 965	5. 0
Oklahoma	529, 843	465, 550	64, 293	1, 124	530	1, 384	----------	26, 717	5. 3
Oregon	248, 118	227, 404	20, 714	2, 012	1, 435	581	49, 250	3, 546	1. 4
Pennsylvania	1, 642, 207	1, 420, 957	221, 250	13, 807	2, 326	4, 300	1, 993, 455	87, 292	5. 6
Rhode Island	125, 698	106, 155	19, 543	1, 071	741	318	144, 876	7, 684	6. 5
South Carolina	216, 805	194, 267	22, 538	432	2, 745	658	----------	17, 170	8. 6
South Dakota	191, 374	171, 067	20, 307	230	1, 030	1, 061	----------	21, 822	12. 9
Tennessee	322, 137	294, 305	27, 832	1, 059	3, 421	693	----------	27, 570	9. 4
Texas	1, 214, 297	1, 060, 028	154, 269	3, 481	2, 505	3, 881	10, 178	102, 890	9. 3
Utah	98, 541	84, 220	14, 321	520	173	--------	----------	4, 567	4. 9
Vermont	86, 231	78, 685	7, 546	521	28	376	89, 606	6, 704	8. 4
Virginia	360, 545	306, 911	53, 634	2, 128	4, 203	3, 524	7, 746	22, 938	6. 8
Washington	402, 875	344, 977	57, 898	2, 598	4, 618	4, 783	499, 149	18, 292	4. 8
West Virginia	251, 556	215, 787	35, 769	1, 355	2, 127	1, 088	73, 468	5, 737	2. 3
Wisconsin	742, 135	646, 747	95, 388	2, 746	1, 360	--------	----------	43, 846	6. 3
Wyoming	56, 336	48, 760	7, 576	128	505	329	----------	4, 381	8. 4
District of Columbia	126, 556	112, 505	14, 051	1, 092	3, 025	1, 835	34, 025	14, 876	13. 3
Total	24, 493, 124	21, 379, 125	3, 113, 999	117, 946	[1] 136, 797	86, 734	8, 941, 861	1, 359, 883	5. 9

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[1] Includes 7,859 United States cars at large not allocated to States.
[2] Busses included with trucks.

TABLE 579.—*Motor-vehicle revenues, 1928, as reported by State authorities*

State	Gross receipts	Motor car registration receipts: All motor cars	Motor car registration receipts: Passenger cars and busses	Motor car registration receipts: Trucks, etc.	Miscellaneous receipts	Disposition of gross receipts [1]: Collection costs	Disposition of gross receipts [1]: State highways	Disposition of gross receipts [1]: Local roads	Disposition of gross receipts [1]: On road bonds and miscellaneous
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
Alabama	3,474					152	1,076	677	1,569
Arizona	566	434	301	133	132		566		
Arkansas	3,786	3,706			80	76	833	568	2,309
California	9,292	7,858	5,175	2,683	1,434	1,427	3,910	3,910	45
Colorado	1,790	1,659	1,332	327	131	166	812	812	
Connecticut	7,373	5,627	4,222	1,405	1,746		7,373		
Delaware	929	745	540	205	184		929		
Florida	4,936	4,874	3,612	1.262	62	522	3,201	1,166	47
Georgia	4.042	3,976	3.321	655	66	143	3,899		
Idaho	1,627	1,578	1,308	270	49		167	1,460	
Illinois	15,521	14,579	11,177	3.402	942		9,337		6,184
Indiana	5,752	5,348	4,121	1,227	404	249	5,503		
Iowa	10,693	10,134	9,092	1,042	559	204	10,068	368	53
Kansas	5,394	5,377			17	287	3,213	1,894	
Kentucky	4,725	4,582	3.605	977	143	195	4,042	488	
Louisiana	4.384	4,303			81		4,384		
Maine	2,763	2,147	1,643	504	616	220	1,364		1,179
Maryland	3.035	2.381	2,088	293	654	304	2,124		607
Massachusetts	13,920	11,128	7,855	3,273	2,792	1,352	11,643		925
Michigan	20,057	18,367	13,942	4,425	1,690	729	12,246	6,000	1,082
Minnesota	10,102	10,011	8,360	1,651	91		6,507		3,595
Mississippi	2,814					141	194	2,479	
Missouri	8,766					370	5,283		3,113
Montana	1,299					76		1,190	33
Nebraska	3,951	3,728	3,166	562	223	118	1,150	2,683	
Nevada	249					11	110		128
New Hampshire	2,071	1,674			397	152	1,906		13
New Jersey	13,569	9,934	6,165	3,769	3,635	850	7,882	4,537	300
New Mexico	628	599	531	68	29	70	372	186	
New York	34,307	31,084	22,301	8,783	3,223	1,786	24,000	5,196	3,325
North Carolina	6.088					300	3,975		1,813
North Dakota	1,775	1,760	1,431	329	15	170	867	738	
Ohio	11,840	11,266	6,405	4,861	574	386	5,970	5,484	
Oklahoma	6,259						2,504	3,755	
Oregon	6,969	6,720	5,742	978	249	300	1,666	1,667	3,336
Pennsylvania	27,114	20,760	14,382	6,378	6,354	1,784	20,510		4,820
Rhode Island	2,274	1,832	1,389	443	442	212	2,031	31	
South Carolina	2,440	2,282	1,942	340	158	25	2,415		
South Dakota	2,902	2,872	2,481	391	30	69	1,450	1,392	
Tennessee	4,066					109	3,957		
Texas	17,701	16,961	14,118	2,843	740	500	10,012	7,189	
Utah	731					130	343		258
Vermont	2,091	1,784	1,498	286	307		2,091		
Virginia	5,572	5,169	4,342	827	403	260	5,312		
Washington	7,028	6,368	4,957	1,411	660	285	4,202	2,039	502
West Virginia	4,143	3,807	2,987	820	336	240	1,263		2,640
Wisconsin	10,775	10,409	8,342	2,067	366	640	5,645	4,490	
Wyoming	573	570	439	131	3		573		
Dist. of Columbia	474	135	113	22	339	133			341
Total	322,630					15,134	208,880	60,399	38,217

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[1] These figures do not always agree with those shown on highway income tables because of time of disposition and use of fiscal years.

TABLE 580.—*Gasoline taxes, 1928, as reported by State authorities*

State	Total tax earnings with refunds deducted	Disposition of total tax earnings: Collection costs	Construction, etc.: State highways[1]	Construction, etc.: Local roads[1]	State and county road bond payments	Miscellaneous uses	Gasoline consumed by motor vehicles	Tax rates per gallon
	1,000 dollars	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 gallons*	*Cents*
Alabama	6,614	35	2,726	3,296	557	----	162,439	4
Arizona	2,018	----	1,261	757	----	----	50,455	4
Arkansas	5,383	108	1,184	807	3,284	----	106,148	5
California	29,567	46	19,681	9,840	----	----	985,559	3
Colorado	3,921	47	2,702	1,158	----	14	130,708	3
Connecticut	3,512	----	3,512	----	----	----	173,438	2
Delaware	800	----	800	----	----	----	26,678	3
Florida	11,258	16	6,741	2,247	----	2,254	224,705	5
Georgia	8,246	4	5,151	2,060	----	1,031	206,137	4
Idaho	1,884	13	1,871	----	----	----	47,097	4
Illinois[2]	837	----	----	----	----	837	41,841	----
Indiana	11,178	19	7,439	2,790	----	930	372,583	3
Iowa	8,536	23	3,447	5,066	----	----	284,521	3
Kansas	5,395	----	4,517	878	----	----	269,742	2
Kentucky	6,743	23	6,720	----	----	----	134,836	5
Louisiana	3,381	----	3,381	----	----	----	169,047	2
Maine	3,192	17	3,175	----	----	----	79,011	4
Maryland	5,426	2	4,339	----	----	1,085	135,647	4
Massachusetts[3]	No tax.	----	----	----	----	----	No tax.	----
Michigan	18,335	90	9,499	5,400	3,000	346	611,161	3
Minnesota	5,768	----	5,768	----	----	----	288,405	2
Mississippi	5,697	6	2,591	2,885	----	215	136,334	5
Missouri	6,948	57	6,891	----	----	----	347,411	2
Montana	1,683	10	1,673	----	----	----	56,114	3
Nebraska	3,941	7	3,934	----	----	----	197,058	2
Nevada	531	----	266	265	----	----	13,280	4
New Hampshire	1,884	1	1,412	----	----	471	47,080	4
New Jersey	8,470	12	8,368	----	----	90	422,347	2
New Mexico	1,852	37	1,415	----	400	----	36,738	5
New York[3]	No tax.	----	----	----	----	----	No tax.	----
North Carolina	9,787	10	6,869	----	2,908	----	244,675	4
North Dakota	1,479	25	1,454	----	----	----	73,973	2
Ohio	24,886	----	15,761	4,148	----	4,977	829,523	3
Oklahoma	8,148	----	5,432	2,716	----	----	279,997	3
Oregon	4,008	9	3,999	----	----	----	144,285	3
Pennsylvania	21,998	----	14,123	4,708	3,167	----	733,269	3
Rhode Island	1,182	----	887	----	295	----	59,116	2
South Carolina	5,518	----	3,311	1,655	552	----	110,365	5
South Dakota	3,159	8	2,210	----	941	----	78,966	4
Tennessee	5,135	51	5,084	----	----	----	171,153	3
Texas	17,945	----	13,459	----	----	4,486	681,135	2
Utah	1,665	6	1,143	----	516	----	47,577	3½
Vermont	1,119	----	1,119	----	----	----	37,311	3
Virginia	8,616	----	5,744	2,872	----	----	174,801	5
Washington	4,207	----	4,207	----	----	----	210,326	2
West Virginia	4,308	----	2,308	----	2,000	----	107,547	4
Wisconsin	6,857	10	2,521	3,833	----	493	342,838	2
Wyoming	954	2	952	----	----	----	31,811	3
District of Columbia	1,263	----	----	----	----	1,263	63,157	2
Total	305,234	694	211,047	57,381	17,620	18,492	10,178,345	3

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[1] These figures do not always agree with those shown on highway income tables because of time of disposition and use of fiscal years.
[2] Only receipts for month of January, as law was found invalid by Supreme Court, Feb. 24, 1928.
[3] Gasoline tax law not effective until Jan. 1, 1929, in Massachusetts, and May 1, 1929, in New York.

TABLE 581.—*Quarterly and annual average rate in cents per hour, by geographic divisions, for common labor employed on Federal-aid projects, 1922–1928*

Year and quarter ending—	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	United States
1922										
March	30	--------	26	30	18	19	24	34	47	28
June	37	33	30	30	21	20	24	36	48	31
September	41	37	33	32	23	21	25	39	50	34
December	43	41	35	32	21	20	23	40	49	34
Average	40	37	33	32	21	20	24	38	49	33
1923										
March	45	41	32	29	19	20	23	38	47	33
June	53	46	40	35	29	23	24	41	52	38
September	53	48	42	37	28	23	25	40	56	40
December	54	48	42	37	29	24	26	43	59	40
Average	53	47	41	36	27	23	25	41	54	39
1924										
March	53	50	41	35	29	23	26	39	51	39
June	51	47	40	35	28	25	26	42	53	39
September	49	42	40	38	28	24	28	41	53	38
December	47	41	40	37	29	24	28	39	53	38
Average	49	43	40	36	28	24	27	40	53	38
1925										
March	46	40	36	39	24	24	28	40	52	37
June	46	43	37	38	29	25	25	45	53	38
September	47	43	37	36	28	25	26	45	52	38
December	46	46	36	37	26	25	28	45	52	38
Average	46	43	37	37	27	25	26	44	52	38
1926										
March	50	45	38	36	28	26	26	43	52	36
June	48	45	38	36	28	25	27	45	53	38
September	48	47	37	36	30	25	27	44	52	39
December	50	48	40	36	30	24	28	42	52	39
Average	49	47	38	36	29	25	27	44	52	38
1927										
March	47	48	40	37	29	24	27	42	52	38
June	50	46	38	38	27	25	31	44	52	40
September	49	47	38	37	28	25	30	46	53	40
December	49	46	40	37	27	25	31	47	54	40
Average	49	47	39	37	28	25	30	45	53	40
1928										
March	52	48	41	38	22	26	27	42	52	38
June	49	43	38	36	26	26	29	46	52	40
September	48	42	38	38	26	25	27	49	53	42
December	51	42	40	39	28	26	30	45	52	41
Average	49	43	39	38	26	26	28	46	52	41
1929										
March	51	45	43	38	22	26	31	43	52	37
June	51	42	39	37	29	26	31	46	53	40
September	51	43	39	37	30	25	31	48	53	40

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TABLE 582.—*Gas tractors manufactured and sold: 1909 to 1928* [1]

Year	Number manufactured in United States [2]				Sold in United States [3]				Sold for export [3]			
	Wheel and track-laying types			Garden tractors and motor culti-vators	Wheel and track-laying types			Garden tractors and motor culti-vators	Wheel and track-laying types			Garden tractors and motor culti-vators
	Wheel	Track-laying	Total		Wheel	Track-laying	Total		Wheel	Track-laying	Total	
1909	-	-	2,000	-	-	-	-	-	-	-	-	-
1910	-	-	4,000	-	-	-	-	-	-	-	-	-
1911	-	-	7,000	-	-	-	-	-	-	-	-	-
1912	-	-	11,500	-	-	-	-	-	-	-	-	-
1913	-	-	7,000	-	-	-	-	-	-	-	-	-
1914	-	-	15,000	-	-	-	-	-	-	-	-	-
1915	-	-	21,000	-	-	-	-	-	-	-	-	-
1916	-	-	29,670	-	-	-	27,819	-	-	-	-	-
1917	-	-	62,742	-	-	-	49,504	-	-	-	14,854	-
1918	-	-	132,697	-	-	-	96,470	-	-	-	36,351	-
1919	-	-	164,590	-	-	-	136,162	-	-	-	19,693	-
1920	-	-	203,207	1,120	-	-	162,988	865	-	-	29,143	20
1921	-	-	68,029	6,780	-	-	-	1,602	-	-	-	1
1922	94,607	4,187	98,794	2,458	96,426	3,666	100,092	2,252	9,497	726	10,223	30
1923	126,906	5,002	131,908	4,676	110,690	4,350	115,040	5,045	15,793	815	16,608	51
1924	112,226	4,612	116,838	[4] 2,505	92,232	4,407	96,639	[4] 2,372	24,649	945	25,594	[4] 28
1925	158,037	6,060	164,097	3,456	114,160	4,579	118,739	3,259	45,073	703	45,776	148
1926	170,302	7,772	178,074	3,921	116,929	6,011	122,940	3,785	46,441	1,164	47,605	121
1927	184,594	10,319	194,913	5,591	147,123	8,720	155,843	4,794	41,998	([5])	-	134
1928	152,266	19,203	171,469	4,465	86,930	12,890	99,820	4,073	([5])	([5])	-	164

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[1] Some steam tractors may be included in number manufactured in 1909 to 1915, inclusive.
[2] 1909 to 1915, inclusive, estimated. Data for 1916 to 1920, inclusive, collected by U. S. Department of Agriculture. (See U. S. D. A. Circular No. 212.) Data for 1921 to 1928, inclusive, collected by U. S. Department of Commerce. (See Manufacture and Sale of Farm Equipment reports published annually by the Bureau of the Census.)
[3] Sales data incomplete for 1916, 1921, 1927, and 1928.
[4] Motor cultivators not included in 1924.
[5] Not shown in Census reports.

TABLE 583.—*Gas tractors sold in the United States and for export, 1922 to 1928, inclusive* [1]

Type of tractor	1922 Sold in the United States	1922 Sold for export	1923 Sold in the United States	1923 Sold for export	1924 Sold in the United States	1924 Sold for export	1925 Sold in the United States	1925 Sold for export	1926 Sold in the United States	1926 Sold for export	1927 Sold in the United States	1927 Sold for export	1928 Sold in the United States	1928 Sold for export
Wheel type:														
8 and less,[2] belt horsepower	544	82												
9 and less, belt horsepower			1,636	1,308										
9 to 18, belt horsepower	79,719	6,801												
10 to 14, belt horsepower			774	85										
15 to 19, belt horsepower			91,295	10,831										
19 to 22, belt horsepower	8,787	897												
Under 20, belt horsepower					67,964	19,894	73,828	33,853	61,848	31,072				
20 to 24, belt horsepower			8,022	1,001	12,281	2,386	17,234	4,322	22,618	5,300				
23 to 26, belt horsepower	907	883												
Under 25, belt horsepower											109,234	27,356	42,743	17,117
25 to 29, belt horsepower			2,072	682	2,279	241	6,567	1,441	11,428	2,254	13,786	4,058	16,916	5,657
27 to 32, belt horsepower	4,773	1,232												
30 to 39, belt horsepower			5,831	1,733	8,572	2,019	15,196	5,273	18,855	7,428	21,397	9,953	25,630	21,781
33 to 39, belt horsepower	285	5												
40 to 49, belt horsepower			725	130	939	100	903	144	1,933	356	2,325	(3)	1,143	602
40 to 59, belt horsepower	1,039	84												
50 and over, belt horsepower			335	23	197	9	432	40	247	31	381	(3)	498	(3)
60 and over, belt horsepower	372	13												
Total wheel type	96,426	9,497	110,690	15,793	92,232	24,649	114,160	45,073	116,929	46,441	147,123	[4] 41,367	86,930	[5] 45,157
Garden type	1,100	9	2,661	35	2,372	28	3,259	148	3,785	121	4,794	134	4,073	164
Motor cultivators [6]	1,152	21	2,384	16										
Tracklaying tractors	3,666	726	4,350	815	4,407	945	4,579	703	6,011	1,164	8,720	(3)	12,890	(3)
Total tractors	102,344	10,253	120,085	16,659	99,011	25,622	121,998	45,924	126,725	47,726	160,637		103,893	

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[1] Manufacture and Sale of Farm Equipment reports published annually by the Bureau of the Census, U. S. Department of Commerce.
[2] May include some garden tractors and motor cultivators.
[3] Not shown in census reports.
[4] Excludes 631 wheel-type tractors not shown by size.
[5] Does not include sizes 50 and over.
[6] Motor cultivators not included in 1924; combined with garden tractors from 1925 to 1928, inclusive.

TABLE 584.—*Tractors, horses, and mules on farms, 1920, 1925, and 1929*

States	Tractors			Horses and mules					
				2 years old and over			Total		
	1920 [1]	1925 [2]	1929 [3]	1920 [1]	1925 [2]	1929 [4]	1920 [1]	1925 [2]	1929 [4]
New England:									
Maine	635	1,774	3,204	91,111	81,346	71,000	94,794	82,664	72,000
New Hampshire	207	531	940	36,921	31,268	24,000	38,442	31,740	24,000
Vermont	444	1,568	2,972	73,253	61,982	52,000	77,832	63,504	53,000
Massachusetts	592	2,212	4,215	49,275	43,473	35,000	50,937	44,062	35,000
Rhode Island	79	318	612	6,418	5,402	4,000	6,615	5,461	4,000
Connecticut	440	1,441	2,686	38,025	34,551	27,000	38,994	34,937	27,000
Middle Atlantic:									
New York	7,497	25,681	48,299	516,944	439,366	381,000	543,494	447,265	388,000
New Jersey	946	4,419	8,681	76,268	61,170	54,000	78,326	62,103	55,000
Pennsylvania	5,697	19,764	37,260	525,426	449,728	389,000	561,047	462,698	400,000
E. N. Central:									
Ohio	10,469	30,905	56,534	767,507	634,223	527,000	842,318	662,843	552,000
Indiana	9,230	23,567	41,705	718,390	624,406	576,000	817,591	657,054	618,000
Illinois	23,102	43,325	69,973	1,249,189	1,113,485	908,000	1,465,126	1,197,669	983,000
Michigan	5,884	19,217	35,950	568,978	474,593	401,000	611,393	489,420	416,000
Wisconsin	9,407	29,651	54,664	631,934	585,317	530,000	687,648	610,666	551,000
W. N. Central:									
Minnesota	15,503	26,739	41,849	834,088	798,945	746,000	943,032	847,281	801,000
Iowa	20,270	37,230	59,609	1,250,004	1,162,783	1,030,000	1,468,042	1,276,830	1,139,000
Missouri	7,889	12,745	19,398	1,043,046	986,173	809,000	1,295,265	1,079,690	887,000
North Dakota	13,006	17,483	24,156	719,384	685,629	543,000	863,555	740,584	599,000
South Dakota	12,939	17,426	24,102	672,881	667,044	553,000	832,151	741,409	615,000
Nebraska	11,100	18,765	29,062	878,815	901,201	789,000	1,061,243	982,330	870,000
Kansas	17,177	31,171	49,681	1,061,401	1,080,778	859,000	1,326,159	1,191,446	964,000
South Atlantic:									
Delaware	239	694	1,263	35,084	31,000	27,000	37,191	31,947	28,000
Maryland	1,525	4,026	7,179	159,382	138,762	117,000	173,962	147,444	125,000
Dist. Columbia	1	8		340	261		343	279	
Virginia	2,379	6,750	12,283	371,128	345,419	288,000	409,295	362,664	303,000
West Virginia	572	1,860	4,493	167,524	149,234	129,000	184,129	157,737	138,000
North Carolina	2,277	7,909	15,431	411,022	406,385	368,000	428,005	410,730	374,000
South Carolina	1,304	2,906	4,958	289,412	245,105	215,000	297,681	248,194	217,000
Georgia	2,252	4,145	6,813	495,479	395,287	383,000	506,854	398,052	386,000
Florida	680	2,777	5,352	76,497	69,292	65,000	80,616	71,504	67,000
E. S. Central:									
Kentucky	2,029	4,994	8,759	592,615	570,419	533,000	675,299	601,232	570,000
Tennessee	1,872	4,767	8,674	575,167	558,210	489,000	670,431	594,684	523,000
Alabama	811	2,465	4,546	404,769	381,414	384,000	426,600	390,172	392,000
Mississippi	667	1,871	3,477	481,192	442,484	420,000	523,068	458,931	436,000
W. S. Central:									
Arkansas	1,822	3,476	5,687	519,530	504,348	454,000	574,603	522,843	475,000
Louisiana	2,812	3,482	4,600	331,778	292,884	257,000	358,871	304,827	269,000
Oklahoma	6,210	10,950	17,259	881,927	897,623	781,000	1,075,078	976,247	849,000
Texas	9,048	16,780	27,238	1,662,551	1,747,305	1,705,000	1,837,294	1,848,308	1,801,000
Mountain:									
Montana	7,647	6,602	14,000	512,187	515,569	448,000	678,185	604,625	526,000
Idaho	1,587	1,927	2,491	243,261	215,253	193,000	300,858	240,391	217,000
Wyoming	1,075	1,323	1,728	146,935	170,578	164,000	201,710	204,666	191,000
Colorado	4,990	6,693	9,237	358,252	362,864	305,000	451,829	403,498	340,000
New Mexico	491	1,080	1,833	167,550	188,033	168,000	203,055	217,410	193,000
Arizona	930	1,239	1,707	111,751	105,113	89,000	148,159	123,735	102,000
Utah	583	850	1,228	101,649	99,421	89,000	128,264	113,865	104,000
Nevada	210	221	255	40,337	45,195	38,000	52,936	54,312	45,000
Pacific:									
Washington	2,635	4,490	6,979	274,877	249,001	216,000	319,472	268,516	234,000
Oregon	3,070	5,768	9,319	234,873	219,742	183,000	285,934	242,910	200,000
California	13,852	29,948	50,648	416,267	349,680	300,000	465,826	370,141	318,000
United States	246,083	505,933	852,989	21,872,594	20,618,744	18,116,000	[5] 25,199,552	22,081,520	19,476,000

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[1] 1920 census (Agriculture), U. S. Department of Commerce.
[2] 1925 Census of Agriculture, U. S. Department of Commerce.
[3] Estimates of tractors on farms in spring of 1929 by Farm Implement News, Feb. 7, 1929.
[4] Estimates by Bureau of Agricultural Economics, U. S. D. A.
[5] Includes 3,338 horses in Montana and 11,207 horses in Arizona not classified in Census Report by age.

TABLE 585.—*Hunters' licenses issued by States, with total money returns, for the seasons 1926–27 and 1927–28*

State	Licenses issued						Money returns [1]	
	Resident		Nonresident and alien		Total			
	1926–27	1927–28	1926–27	1927–28	1926–27	1927–28	1926–27	1927–28
							Dollars	*Dollars*
Alaska [2]	----------	----------	182	268	182	268	12, 860. 00	18, 870. 00
Alabama	54, 635	86, 843	131	201	54, 766	87, 044	83, 484. 24	99, 858. 00
Arizona	30, 000	38, 134	400	631	30, 400	38, 765	45, 000, 00	52, 449. 35
Arkansas	90, 000	100, 000	--------	1, 500	90, 000	101, 500	90, 000. 00	117, 500. 00
California	250, 891	226, 109	2, 641	2, 587	253, 532	228, 696	279, 701. 00	464, 145. 00
Colorado	[3] 90, 999	[3] 107, 305	365	420	91, 364	107, 725	205, 237. 45	227, 612. 50
Connecticut	37, 521	37, 212	599	712	38, 120	37, 924	111, 070. 50	103, 402. 00
Delaware	[3] 2, 115	[3] 1, 970	356	344	2, 471	2, 314	6, 064. 50	5, 410. 00
Florida	59, 679	59, 440	709	581	60, 388	60, 021	163, 105. 00	223, 154. 25
Georgia	64, 755	79, 592	226	211	64, 981	79, 803	79, 155. 00	108, 781. 84
Idaho	[3] 70, 500	[3] 75, 730	568	352	71, 068	76, 082	143, 357. 75	150, 567. 85
Illinois	286, 908	303, 567	1, 691	1, 500	288, 599	305, 067	231, 196. 02	319, 317. 00
Indiana	[3] 251, 226	[3] 310, 204	449	[3] 517	251, 675	310, 721	232, 930. 20	287, 058. 80
Iowa	[3] 161, 008	[3] 164, 647	290	363	161, 298	165, 010	163, 908. 00	168, 277. 00
Kansas	113, 526	115, 165	129	92	113, 655	115, 257	115, 461. 00	116, 545. 00
Kentucky	90, 954	108, 202	62	79	91, 016	108, 281	78, 850. 00	109, 031. 50
Louisiana	106, 210	102, 411	262	242	106, 472	102, 653	126, 697. 00	108, 536. 00
Maine	[3] 37, 241	[3] 39, 979	54	3, 544	37, 295	43, 523	62, 913. 35	71, 578. 55
Maryland	62, 869	69, 025	2, 117	1, 841	64, 986	70, 866	117, 420. 55	132, 834. 55
Massachusetts	108, 746	107, 615	2, 621	2, 881	111, 367	110, 496	234, 556. 00	231, 427. 00
Michigan	293, 084	362, 808	2, 385	2, 465	295, 469	365, 273	379, 003. 20	530, 196. 48
Minnesota	172, 000	118, 001	400	234	172, 400	118, 235	240, 000. 00	127, 497. 40
Missouri	[3] 255, 426	[3] 231, 101	3, 998	[3] 789	259, 424	231, 890	313, 265. 48	275, 908. 12
Montana	[3] 67, 078	[3] 75, 063	[3] 3, 578	261	70, 656	75, 324	145, 104. 30	155, 736. 00
Nebraska	[3] 146, 246	[3] 163, 447	[3] 474	[3] 133	146, 720	163, 580	150, 995. 25	166, 772. 00
Nevada	5, 506	5, 327	60	151	5, 566	5, 478	8, 259. 00	9, 410. 50
New Hampshire	[3] 52, 647	[3] 55, 401	[3] 2, 305	[3] 2, 319	54, 952	57, 720	105, 648. 45	109, 576. 35
New Jersey	[3] 167, 415	[3] 183, 280	[3] 1, 787	[3] 1, 941	169, 202	185, 221	232, 093. 25	266, 427. 10
New Mexico	16, 399	[3] 15, 971	723	[3] 1, 444	17, 122	17, 415	49, 388. 45	79, 660. 25
New York	615, 344	[3] 670, 441	5, 070	[3] 5, 339	620, 414	675, 780	822, 415. 00	699, 873. 52
North Carolina	137, 099	144, 274	876	994	137, 975	145, 268	203, 000. 00	207, 900. 00
North Dakota	34, 238	35, 108	160	163	34, 398	35, 271	51, 943. 70	56, 737. 00
Ohio	363, 000	368, 377	--------	108	363, 000	368, 485	453, 750. 00	369, 997. 00
Oklahoma	[3] 80, 169	153, 001	154	331	80, 323	153, 332	82, 416. 50	157, 918. 00
Oregon	54, 922	[3] 57, 407	748	[3] 779	55, 670	58, 186	202, 395. 00	210, 711. 75
Pennsylvania	520, 574	515, 948	3, 505	1, 781	524, 079	517, 729	649, 549. 10	1, 006, 159. 70
Rhode Island	13, 213	10, 342	274	243	13, 487	10, 585	16, 313. 00	21, 527. 00
South Carolina	68, 048	111, 070	1, 065	1, 294	69, 113	112, 364	116, 466. 65	167, 590. 00
South Dakota	91, 924	[3] 101, 508	1, 464	2, 680	93, 388	104, 188	133, 136. 00	174, 938. 00
Tennessee	45, 000	63, 026	200	280	45, 200	63, 306	63, 000. 00	78, 527. 32
Texas	83, 707	104, 703	397	488	84, 104	105, 191	163, 540. 95	221, 606. 00
Utah	[3] 52, 942	[3] 40, 792	[3] 98	[3] 140	53, 040	40, 932	116, 944. 73	93, 663. 00
Vermont	[3] 37, 049	[3] 37, 208	[3] 1, 128	[3] 1, 058	38, 177	38, 266	53, 454. 15	54, 711. 30
Virginia	95, 054	116, 133	2, 194	2, 565	97, 248	118, 698	154, 242. 60	199, 637. 40
Washington	[3] 196, 213	[3] 201, 372	[3] 729	[3] 703	196, 942	202, 075	358, 656. 00	371, 356. 00
West Virginia	[3] 127, 305	[3] 141, 706	235	445	127, 540	142, 151	130, 830. 00	148, 381. 00
Wisconsin	155, 843	172, 667	231	462	156, 074	173, 129	146, 046. 10	189, 892. 00
Wyoming	[3] 23, 885	[3] 24, 822	[3] 592	645	24, 477	25, 467	63, 000. 00	69, 507. 50
Total [4]	5, 941, 113	6, 413, 454	48, 682	49, 101	5, 989, 795	6, 462, 555	8, 187, 223. 82	9, 338, 173. 88

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[1] Includes amounts received from combined hunting and fishing licenses, but not from licenses to fish only.
[2] No resident license required.
[3] Combined hunting and fishing license.
[4] Totals are exclusive of Mississippi, for which figures are not available, and include figures for combined hunting and fishing licenses, which for many States can not be separated, many such licenses being taken out by anglers only.

TABLE 586.—*National forest areas, by districts, June 30, 1929*

District	Name	District headquarters	Gross area	Alienated lands	Net area
			Acres	*Acres*	*Acres*
1	Northern district	Missoula, Mont	26, 781, 219	3, 966, 338	22, 814, 881
2	Rocky Mountain district	Denver, Colo	20, 957, 083	1, 784, 282	19, 172, 801
3	Southwestern district	Albuquerque, N. Mex	21, 458, 169	2, 223, 123	19, 235, 046
4	Intermountain district	Ogden, Utah	30, 685, 614	1, 177, 196	29, 508, 418
5	California district	San Francisco, Calif	24, 149, 650	4, 950, 019	19, 199, 631
6	North Pacific district	Portland, Oreg	26, 847, 201	3, 855, 155	22, 992, 046
7	Eastern district	Washington, D. C	9, 732, 694	5, 553, 648	4, 179, 046
8	Alaska district	Juneau, Alaska	21, 397, 515	51, 590	21, 345, 925
9	Lake States district	Milwaukee, Wis	2, 555, 808	1, 253, 082	1, 302, 726
	Total of the 9 districts		184, 564, 953	24, 814, 433	159, 750, 520

DISTRICT HEADQUARTERS

DISTRICT 1.—Northern District: Office, Federal Building, Missoula, Mont. Embracing Montana northeastern Washington, northern Idaho, and northwestern South Dakota.

DISTRICT 2.—Rocky Mountain District: Office, Federal Building, Denver, Colo. Embracing Colorado, Wyoming, South Dakota, Nebraska, Oklahoma, and Illinois.

DISTRICT 3.—Southwestern District: Office, Gas and Electric Building, Albuquerque, N. Mex. Embracing Arizona and New Mexico.

DISTRICT 4.—Intermountain District: Office, Forest Service Building, Ogden, Utah. Embracing Utah, southern Idaho, western Wyoming, Nevada, and northwestern Arizona.

DISTRICT 5.—California District: Office, Ferry Building, San Francisco, Calif. Embracing California and southwestern Nevada.

DISTRICT 6.—North Pacific District: Office, Post Office Building, Portland, Oreg. Embracing Washington and Oregon.

DISTRICT 7.—Eastern District: Office, Atlantic Building, Washington, D. C. Embracing Alabama, Arkansas, Florida, Georgia, Maine, New Hampshire, North Carolina, Pennsylvania, Porto Rico, South Carolina, Tennessee, Virginia, and West Virginia.

DISTRICT 8.—Alaska District: Office, Goldstein Building, Juneau, Alaska. Located in Alaska.

DISTRICT 9.—Lake States District: Office, Customs Service Building, Milwaukee, Wis. Embracing Michigan and Minnesota.

NATIONAL MONUMENTS

The following national monuments situated within national forests and administered by the Department of Agriculture have been created under the act of June 8, 1906 (34 Stat. 225), for the preservation of objects of historic or scientific interest:

Name	National forest	State	Area	Latest change in boundary
			Acres	
Bandelier	Santa Fe	New Mexico	22, 075	Feb. 11, 1916
Chiricahua	Coronado	Arizona	4, 480	Apr. 18, 1924
Devil Postpile	Sierra	California	800	July 6, 1911
Gila Cliff Dwellings	Gila	New Mexico	160	Nov. 16, 1907
Holy Cross	Holy Cross	Colorado	1, 392	May 11, 1929
Jewel Cave	Harney	South Dakota	1, 280	Feb. 7, 1908
Lava Beds	Modoc	California	45, 967	Nov. 21, 1925
Lehman Caves	Nevada	Nevada	593	Jan. 24, 1922
Mount Olympus	Olympic	Washington	298, 730	Jan. 7, 1929
Old Kasaan	Tongass	Alaska	38	Oct. 25, 1916
Oregon Caves	Siskiyou	Oregon	480	July 12, 1909
Timpanogos Cave	Wasatch	Utah	250	Oct. 14, 1922
Tonto	Tonto	Arizona	640	Dec. 19, 1907
Walnut Canyon	Coconino	do	960	Nov. 30, 1915
Wheeler	Cochetopa Rio Grande	Colorado	300	Dec. 7, 1908
Total area			378, 145	

NATIONAL GAME REFUGES

The following national refuges situated wholly or in part within national forests have been designated under special acts of Congress for the protection of game:

Name	National forest	State	Area	Latest change in boundary
			Acres	
Cherokee National Game Refuge No. 1	Cherokee	Tennessee	30,000	Aug. 5, 1924
Cherokee National Game Refuge No. 2	do	Georgia	14,000	Do.
Custer State Park Game Sanctuary	Harney	South Dakota	44,840	Jan. 14, 1929
Grand Canyon	Tusayan Kaibab	Arizona	792,163	Feb. 26, 1919
Ozark National Game Refuge No. 1	Ozark	Arkansas	8,420	Apr. 26, 1926
Ozark National Game Refuge No. 2	do	do	5,300	Do.
Ozark National Game Refuge No. 3	do	do	3,620	Do.
Ozark National Game Refuge No. 4	do	do	4,160	Do.
Pisgah	Pisgah	North Carolina	98,381	Oct. 17, 1916
Sequoia	Sequoia	California	16,300	July 3, 1926
Sheep Mountain	Medicine Bow	Wyoming	28,318	Aug. 8, 1924
Wichita	Wichita	Oklahoma	60,800	June 2, 1905

The following national forests, or parts of national forests, established under section 9 of the Clarke-McNary Act of June 7, 1924 (43 Stat. 653), were on July 1, 1925, designated game refuges by the acting Secretaries of War and Agriculture:

National forest	State	Area
		Acres
Black Hills (Meade district)	South Dakota	5,548
Manzano (Zuni district)	New Mexico	45,423
Medicine Bow (Pole Mountain district)	Wyoming	56,132
Michigan (Brady district)	Michigan	2,680

RANGE RESERVES

The following reserves have been established by Executive order for use by the Forest Service in conducting studies of grazing and range management:

Name	State	Area	Latest change in boundary
		Acres	
Jornada	New Mexico	193,686	July 10, 1925
Santa Rita	Arizona	52,399	Mar. 2, 1927

TABLE 587.—*Consumption of domestic lumber, 1928* [1]

[Thousand feet b. m.]

State	Region	Softwoods: Derived within State	Softwoods: Derived from other States	Softwoods: Total consumption (domestic)	Hardwoods: Derived within State	Hardwoods: Derived from other States	Hardwoods: Total consumption (domestic)	All lumber: Derived within State	All lumber: Derived from other States	All lumber: Total consumption (domestic)
Alabama	S. P.	319, 948	166, 919	486, 867	31, 615	7, 579	39, 194	351, 563	174, 498	526, 061
Arizona	R. M. (S.)	42, 090	41, 365	83, 455		968	968	42, 090	42, 333	84, 423
Arkansas	S. P.	120, 992	44, 295	165, 287	168, 794	66, 644	235, 438	289, 786	110, 939	400, 725
California	P. (S.)	1, 003, 881	2, 000, 744	3, 004, 625	201	54, 304	54, 505	1, 004, 082	2, 055, 048	3, 059, 130
Colorado	R. M. (S.)	41, 908	182, 619	224, 527	57	2, 857	2, 914	41, 965	185, 476	227, 441
Connecticut	N.	4, 798	203, 462	208, 260	23, 003	29, 305	52, 380	27, 801	232, 767	260, 568
Delaware	N.	3, 505	40, 569	44, 074	2, 235	1, 386	3, 621	5, 740	41, 955	47, 695
District of Columbia	N.		45, 488	45, 488		1, 983	1, 983		47, 471	47, 471
Florida	S. P.	378, 961	16, 715	395, 676	13, 334	6, 196	19, 530	392, 295	22, 911	415, 206
Georgia	S. P.	205, 262	111, 603	316, 865	40, 134	7, 741	47, 875	245, 396	119, 344	364, 740
Idaho	R. M. (N.)	143, 768	67, 203	210, 971	2		2	143, 770	67, 203	210, 973
Illinois	C.	347	1, 783, 759	1, 784, 106	19, 855	452, 555	472, 410	20, 202	2, 236, 314	2, 256, 516
Indiana	C.	21	551, 615	551, 636	76, 321	202, 002	278, 323	76, 342	753, 617	829, 959
Iowa	P.		509, 409	509, 409	8, 740	30, 986	39, 726	8, 740	540, 395	549, 135
Kansas	P.		375, 925	375, 925	710	28, 276	28, 986	710	404, 201	404, 911
Kentucky	C.	4, 137	270, 786	274, 923	53, 849	122, 624	176, 473	57, 986	393, 410	451, 396
Louisiana	S. P.	307, 312	158, 956	466, 268	170, 645	70, 827	241, 472	477, 957	229, 783	707, 740
Maine	N.	154, 332	46, 331	200, 663	22, 884	8, 631	31, 515	177, 216	54, 962	232, 178
Maryland	N.	35, 561	407, 959	443, 520	13, 464	47, 959	61, 423	49, 025	455, 918	504, 943
Massachusetts	N.	59, 364	522, 791	582, 155	10, 679	104, 350	115, 029	70, 043	627, 141	697, 184
Michigan	L.	93, 687	788, 498	882, 185	368, 467	373, 535	742, 002	462, 154	1, 162, 033	1, 624, 187
Minnesota	L.	118, 344	469, 961	588, 305	48, 659	63, 883	112, 542	167, 003	533, 844	700, 847
Mississippi	S. P.	314, 620	25, 763	340, 383	77, 292	18, 334	95, 626	391, 912	44, 097	436, 009
Missouri	C.	27, 948	581, 358	609, 306	52, 276	97, 601	149, 877	80, 224	678, 959	759, 183
Montana	R. M. (N.)	192, 242	73, 791	266, 033	77	373	450	192, 319	74, 164	266, 483
Nebraska	P.		296, 077	296, 077		7, 693	7, 693		303, 770	303, 770
Nevada	P. (S.)	104	53, 539	53, 643				104	53, 539	53, 643
New Hampshire	N.	117, 561	51, 729	169, 290	13, 817	15, 806	29, 623	131, 378	67, 535	198, 913
New Jersey	N.	102	588, 121	588, 223	3, 118	77, 748	80, 866	3, 220	665, 869	669, 089
New Mexico	R. M. (S.)	62, 909	45, 913	108, 822		1, 212	1, 212	62, 909	47, 125	110, 034
New York	N.	28, 403	2, 212, 827	2, 241, 230	58, 133	273, 307	331, 440	86, 536	2, 486, 134	2, 572, 670
North Carolina	N. C. P.	330, 138	102, 893	433, 031	81, 763	103, 336	185, 099	411, 901	206, 229	618, 130
North Dakota	P.		136, 262	136, 262		449	449		136, 711	136, 711
Ohio	C.	120	1, 093, 890	1, 094, 010	82, 247	289, 361	371, 608	82, 367	1, 383, 251	1, 465, 618
Oklahoma	S. P.	101, 085	336, 280	437, 365	5, 605	10, 364	15, 969	106, 690	346, 644	453, 334
Oregon	P. (N.)	948, 000	81, 796	1, 029, 796	10, 020	4, 355	14, 375	958, 020	86, 151	1, 044, 171
Pennsylvania	N.	50, 992	1, 211, 702	1, 262, 694	127, 014	322, 677	449, 691	178, 006	1, 534, 379	1, 712, 385
Rhode Island	N.	520	145, 591	146, 111	625	6, 035	6, 660	1, 145	151, 626	152, 771
South Carolina	N. C. P.	91, 436	21, 014	112, 450	10, 215	4, 090	14, 305	101, 651	25, 104	126, 755

South Dakota	P	27, 436	129, 996	157, 432		7, 844	7, 844	27, 436	137, 840	165, 276
Tennessee	C	27, 315	354, 145	381, 460	211, 702	208, 971	420, 673	239, 017	563, 116	802, 133
Texas	S. P	745, 306	690, 188	1, 444, 494	99, 918	33, 455	133, 373	854, 224	723, 643	1, 577, 867
Utah	R. M. (S.)	7, 361	119, 262	126, 623	262	1, 181	1, 443	7, 623	120, 443	128, 066
Vermont	N	37, 875	21, 560	59, 435	25, 234	3, 927	29, 161	63, 109	25, 487	88, 596
Virginia	N. C. P	96, 854	218, 675	315, 529	59, 984	74, 479	134, 463	156, 838	293, 154	449, 992
Washington	P. (N.)	1, 533, 730	152, 281	1, 686, 011	9, 227	1, 551	10, 778	1, 542, 957	153, 832	1, 696, 789
West Virginia	C	18, 152	93, 336	111, 488	99, 807	24, 086	123, 893	117, 959	117, 422	235, 381
Wisconsin	L	203, 302	479, 209	682, 511	241, 558	81, 956	323, 514	444, 860	561, 165	1, 006, 025
Wyoming	R. M. (S.)	24, 077	110, 372	134, 449	6	214	220	24, 083	110, 586	134, 669
Total, all States		8, 034, 806	18, 234, 542	26, 269, 348	2, 343, 548	3, 354, 996	5, 698, 544	10, 378, 354	21, 589, 538	31, 967, 892

SUMMARY BY LUMBER-PRODUCING REGIONS

State	Region	Softwoods			Hardwoods			All lumber		
		Derived within region	Derived from other regions	Total	Derived within region	Derived from other regions	Total	Derived within region	Derived from other regions	Total
Northeastern	N	720, 090	5, 271, 053	5, 991, 143	421, 552	771, 768	1, 193, 320	1, 141, 642	6, 042, 821	7, 184, 463
Lake	L	586, 069	1, 566, 932	2, 153, 001	799, 466	378, 592	1, 178, 058	1, 385, 535	1, 945, 524	3, 331, 059
Central	C	182, 024	4, 624, 905	4, 806, 929	922, 343	1, 070, 914	1, 993, 257	1, 104, 367	5, 695, 819	6, 800, 186
North Carolina pine	N. C. P	619, 910	241, 100	861, 010	228, 240	105, 627	333, 867	848, 150	346, 727	1, 194, 877
Southern pine	S. P	3, 667, 023	386, 182	4, 053, 205	812, 765	15, 712	828, 477	4, 479, 788	401, 894	4, 881, 682
Pacific (north)	P. (N.)	2, 597, 675	118, 132	2, 715, 807	19, 247	5, 906	25, 153	2, 616, 922	124, 038	2, 740, 960
Pacific (south)	P. (S.)	1, 028, 727	2, 029, 541	3, 058, 268	201	54, 304	54, 505	1, 028, 928	2, 083, 845	3, 112, 773
Rocky Mountain (north)	R. M. (N.)	360, 033	116, 971	477, 004	79	373	452	360, 112	117, 344	477, 456
Rocky Mountain (south)	R. M. (S.)	220, 282	457, 594	677, 876	325	6, 432	6, 757	220, 607	464, 026	684, 633
Prairie	P	40, 183	1, 434, 922	1, 475, 105	9, 475	75, 223	84, 698	49, 658	1, 510, 145	1, 559. 803
Total	U. S	10, 022, 016	16, 247, 332	26, 269, 348	3, 213, 693	2, 484, 851	5, 698, 544	13, 235, 709	18, 732, 183	31, 967, 892

Forest Service in cooperation with the Bureau of the Census.

[1] Preliminary figures.

TABLE 588.—*Production of lumber, by States, 1899, 1909, 1919, 1926–1928*

State	1899	1909	1919	1926	1927	1928
	M ft. b. m.	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*
Alabama	1, 101, 386	1, 691, 001	1, 798, 746	2, 105, 122	2, 171, 687	1, 980, 082
Arizona	36, 182	62, 731	73, 655	115, 232	169, 085	158, 047
Arkansas	1, 623, 987	2, 111, 300	1, 772, 157	1, 441, 018	1, 229, 481	1, 129, 731
California	737, 035	1, 143, 507	1, 259, 363	[1] 2, 187, 959	[1] 2, 070, 811	[1] 1, 952, 659
Colorado	133, 746	141, 710	64, 864	75, 278	67, 321	72, 257
Connecticut	108, 093	168, 371	86, 708	47, 367	55, 949	35, 356
Delaware	35, 955	55, 440	27, 437	9, 433	16, 824	13, 161
Florida	790, 373	1, 201, 734	1, 137, 432	920, 585	907, 128	995, 072
Georgia	1, 311, 917	1, 342, 249	893, 965	1, 145, 489	1, 201, 008	1, 039, 475
Idaho	65, 363	645, 800	765, 388	947, 471	923, 986	977, 468
Illinois	388, 469	170, 181	64, 628	38, 357	28, 663	29, 623
Indiana	1, 036, 999	556, 418	282, 487	139, 472	148, 492	126, 790
Iowa	352, 411	132, 021	18, 493	(2)	(2)	(2)
Kansas	10, 665	4, 716	2, 840	(2)	(2)	(2)
Kentucky	774, 651	860, 712	512, 078	216, 759	197, 618	174, 340
Louisiana	1, 115, 366	3, 551, 918	3, 163, 871	2, 889, 530	2, 385, 724	2, 278, 422
Maine	784, 647	1, 111, 565	596, 116	340, 893	263, 818	266, 523
Maryland	183, 711	267, 939	113, 362	68, 444	67, 541	59, 729
Massachusetts	344, 190	361, 200	166, 841	86, 168	88, 298	112, 299
Michigan	3, 018, 338	1, 889, 724	875, 891	663, 344	578, 254	572, 059
Minnesota	2, 342, 338	1, 561, 508	699, 639	471, 090	396, 891	412, 343
Mississippi	1, 206, 265	2, 572, 669	2, 390, 135	2, 894, 994	2, 556, 612	2, 524, 319
Missouri	723, 754	660, 159	321, 383	178, 568	189, 136	141, 990
Montana	255, 685	308, 582	287, 378	378, 698	396, 267	387, 879
Nebraska	4, 655	(2)	505			
Nevada	725	(2)	20, 335	(4)	(4)	(4)
New Hampshire	572, 447	649, 606	338, 777	243, 007	215, 912	239, 261
New Jersey	74, 118	61, 620	36, 888	6, 953	5, 044	3, 220
New Mexico	30, 880	91, 987	86, 808	127, 110	172, 517	162, 030
New York	878, 448	681, 440	357, 764	170, 963	142, 505	130, 106
North Carolina	1, 286, 638	2, 177, 715	1, 654, 435	970, 965	1, 055, 222	1, 020, 893
Ohio	990, 497	542, 901	280, 076	141, 499	127, 880	112, 229
Oklahoma	22, 104	225, 730	168, 403	149, 929	169, 943	193, 793
Oregon	734, 538	1, 898, 995	2, 577, 403	4, 454, 735	3, 992, 852	4, 371, 924
Pennsylvania	2, 333, 278	1, 462, 771	630, 471	318, 797	277, 722	238, 615
Rhode Island	18, 528	25, 489	11, 030	5, 426	6, 815	4, 622
South Carolina	466, 429	897, 660	621, 679	920, 825	817, 016	821, 900
South Dakota	[5] 33, 734	31, 057	42, 970	49, 281	46, 909	53, 967
Tennessee	950, 958	1, 223, 849	792, 132	683, 323	595, 297	530, 306
Texas	1, 232, 404	2, 099, 130	1, 379, 774	1, 456, 121	1, 446, 460	1, 446, 686
Utah	17, 548	12, 638	11, 917	6, 479	6, 152	7, 623
Vermont	375, 809	351, 571	218, 479	111, 638	90, 880	107, 358
Virginia	959, 119	2, 101, 716	1, 098, 038	676, 663	535, 616	547, 706
Washington	1, 429, 032	3, 862, 916	4, 961, 220	7, 546, 239	7, 325, 862	7, 305, 277
West Virginia	778, 051	1, 472, 942	763, 103	588, 788	541, 870	547, 823
Wisconsin	3, 389, 166	2, 025, 038	1, 116, 338	912, 524	819, 507	818, 850
Wyoming	16, 963	28, 602	8, 674	19, 392	12, 863	24, 402
All other	[6] 6, 571	[7] 11, 230		14, 002	16, 982	13, 908
United States	[8] 35, 084, 166	44, 509, 761	[8 9] 34, 552, 076	[10 11] 36, 935, 930	[10 11] 34, 532, 420	[10 11] 34, 142, 123

SUMMARY BY LUMBER-PRODUCING REGIONS

REGIONS	1899	1909	1919	1926	1927	1928
Northeastern	5, 709, 224	5, 197, 012	2, 583, 873	1, 409, 098	1, 231, 308	1, 210, 250
Lake	8, 749, 842	5, 476, 270	2, 691, 868	2, 046, 958	1, 794, 652	1, 803, 252
Central	5, 643, 379	5, 487, 165	3, 015, 887	1, 986, 766	1, 828, 956	1, 663, 101
North Carolina pine	2, 712, 186	5, 177, 091	3, 374, 152	2, 568, 453	2, 407, 854	2, 390, 499
Southern pine	8, 403, 802	14, 795, 731	12, 704, 483	13, 002, 788	12, 068, 043	11, 587, 580
Pacific (north)	2, 163, 570	5, 761, 911	7, 538, 623	12, 000, 974	11, 318, 714	11, 677, 201
Pacific (south)	737, 760	1, 143, 507	1, 279, 698	2, 187, 959	2, 070, 811	1, 952, 659
Rocky Mountain (north)	321, 048	954, 382	1, 052, 766	1, 326, 169	1, 320, 253	1, 365, 347
Rocky Mountain (south)	235, 319	337, 668	245, 918	343, 491	427, 938	424, 359
Prairie	[12] 408, 036	[12] 179, 024	64, 808	[12] 63, 283	[12] 63, 891	[12] 67, 875

Forest Service in cooperation with Bureau of the Census.

[1] Includes cut of Nevada.
[2] Included in "All other."
[4] Included with California.
[5] Includes cut of North Dakota.
[6] Reported as cut of Alaska.
[7] Includes cut of Nebraska and Nevada.
[8] Includes both merchant and custom sawing.
[9] Includes 2,655 mills cutting less than 50,000 feet each per year.
[10] Mills cutting less than 50,000 feet each year excluded.
[11] Excludes custom mills.
[12] Includes "All other."

TABLE 589.—*Lumber prices: Average values per thousand feet, f. o. b. mill, Douglas fir and southern yellow pine*

Year and month	Douglas fir		Southern yellow pine		Year and month	Douglas fir		Southern yellow pine	
	Price	Price index 1913=100	Price	Price index 191=3100		Price	Price index 1913=100	Price	Price index 1913=100
	Dollars		*Dollars*		1929	*Dollars*		*Dollars*	
1913	11.44	100.0	14.77	100.0	January	20.12	175.9	26.20	177.4
1914	10.58	92.5	13.68	92.6	February	20.30	177.4	25.56	173.1
1915	9.80	85.5	13.02	88.2	March	21.24	185.7	26.40	178.7
1916	11.63	101.7	16.12	109.2	April	21.21	185.4	27.74	187.8
1917	16.93	147.9	21.13	143.1	May	21.81	190.6	26.18	177.3
1918	21.21	186.3	26.45	179.1	June	21.35	186.6	26.46	179.1
1919	25.83	225.9	33.94	229.8	July	21.29	186.1	25.47	172.4
1920	36.78	323.3	44.74	302.9	August	21.32	186.4		
1921	19.98	174.7	21.18	143.4	September	21.41	187.2		
1922	23.90	208.9	26.44	179.0	October	21.00	183.6		
1923	28.93	252.9	30.81	208.6	November				
1924	23.14	202.3	28.16	190.7	December				
1925	21.63	189.1	28.31	191.7					
1926	21.13	184.7	[1] 26.83	181.7					
1927	20.42	178.5	25.62	173.5					
1928	20.01	174.9	25.32	171.4					

Forest Service. Compiled from reports of actual sales.

[1] Based on prices for 11 months.

NOTE.—Tables 553, pulpwood consumption, and 554, woodland on farms, 1927 Yearbook, omitted.

TABLE 590.—*Federal forest funds available for benefit of States*

State	Federal allotments to States Clark-McNary law, fiscal year ending June 30, 1930		Amounts available to States fiscal year ending June 30, 1930 (from receipts fiscal year 1929)		Total, all sources
	Forest fire cooperation, section 2	Distribution of planting stock, section 4	From 10 per cent funds	From 25 per cent funds	
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Alabama	42,090	2,000	76	189	44,355
Arizona			37,059	92,649	129,708
Arkansas			7,563	18,908	26,471
California	90,427	797	142,646	356,606	590,476
Colorado		2,000	49,886	124,715	176,601
Connecticut	10,932	2,000			12,932
Delaware	919	2,000			2,919
Florida	37,017	1,357	3,156	7,890	49,420
Georgia	40,664	2,000	1,341	3,352	47,357
Idaho	62,390	900	62,771	156,928	282,989
Illinois	2,179				2,179
Indiana	1,700	2,000			3,700
Iowa		2,000			2,000
Kansas		2,000			2,000
Kentucky	14,330	2,000			16,330
Louisiana	40,930	2,000			42,930
Maine	52,265	1,500	566	1,416	55,747
Maryland	9,929	2,000			11,929
Massachusetts	28,627	2,000			30,627
Michigan	79,380	2,000	674	1,685	83,739
Minnesota	83,798		2,850	7,125	93,773
Mississippi	35,656				35,656
Missouri	8,000	1,800			9,800
Montana	25,879	2,000	26,388	65,969	120,236
Nebraska		2,000	958	2,396	5,354
Nevada			9,252	23,131	32,383
New Hampshire	16,852	2,000	7,813	19,532	46,197
New Jersey	19,712	2,000			21,712
New Mexico	2,181		13,951	34,877	51,009
New York	63,511	2,000			65,511
North Carolina	44,757	2,000	3,062	7,655	57,474
North Dakota		2,000			2,000
Ohio	5,315	2,000			7,315
Oklahoma	14,429	2,000	457	1,142	18,028
Oregon	83,575	2,000	106,007	265,026	456,608
Pennsylvania	49,351	2,000	405	1,012	52,768
Rhode Island	1,886				1,886
South Carolina	20,250	2,000	507	1,267	24,024
South Dakota	375		17,195	42,988	60,558
Tennessee	23,619	2,000	1,192	2,981	29,792
Texas	32,661				32,661
Utah			20,515	51,287	71,802
Vermont	7,694	2,000			9,694
Virginia	32,814	2,000	3,695	9,238	47,747
Washington	90,389	1,980	67,112	167,779	327,260
West Virginia	22,733	1,500	698	1,745	26,676
Wisconsin	37,987	2,000			39,987
Wyoming		1,948	29,784	74,460	106,192
Total United States	1,237,203	69,782	617,579	1,543,948	3,468,512
Alaska			8,252	20,629	28,881
Hawaii		2,000			2,000
Porto Rico		2,000	25	63	2,088
Administration, contingent, and miscellaneous	162,797	9,218			172,015
Total	1,400,000	83,000	625,856	1,564,640	3,673,496

Forest Service.

TABLE 591.—*Number of stock grazed on national forests, calendar year 1928, and total grazing receipts, fiscal year 1929, by States*

	Cattle	Horses	Swine	Sheep and goats [1]	Receipts from grazing [2]
	Number	*Number*	*Number*	*Number*	*Dollars*
Alabama	34	2			10
Arizona	191, 058	11, 118	475	297, 442	149, 107
Arkansas	2, 023	5	1, 700	210	176
California	150, 636	8, 357	557	444, 177	190, 904
Colorado	279, 960	10, 310	68	1, 051, 046	322, 297
Florida	393		768	1, 359	227
Idaho	121, 786	14, 902		1, 338, 996	225, 077
Montana	121, 589	13, 002		603, 053	139, 818
Nebraska	11, 265	590			9, 412
Nevada	51, 381	3, 424		316, 538	84, 008
New Hampshire	129	35			216
New Mexico	84, 535	9, 369	308	240, 776	91, 881
North Carolina	421	43	689	246	266
Oklahoma	2, 496	79			3, 137
Oregon	85, 084	5, 638		648, 328	156, 971
Pennsylvania	250				
South Dakota	23, 708	1, 908		20, 180	18, 186
Tennessee	1, 024	38	164	262	162
Utah	112, 083	8, 010	175	758, 990	174, 607
Virginia	908	15		467	510
Washington	11, 296	1, 100		161, 513	42, 717
West Virginia	203	63	39	965	383
Wyoming	106, 563	7, 468		656, 383	130, 033
Total	1, 358, 825	95, 476	4, 943	6, 540, 931	[3] 1, 740, 290

SUMMARY BY ADMINISTRATIVE DISTRICTS

	Cattle	Horses	Swine	Sheep and goats [1]	Receipts from grazing [2]
District:					
1	127, 320	14, 092		698, 377	161, 117
2	380, 910	18, 095	68	1, 477, 011	428, 401
3	274, 407	20, 445	783	535, 813	239, 634
4	323, 787	27, 548	175	2, 572, 203	509, 576
5	150, 636	8, 357	557	444, 177	199, 427
6	96, 380	6, 738		809, 841	199, 999
7	5, 385	201	3, 360	3, 509	2, 136
8					

Forest Service.

[1] Goats form less than three-tenths of 1 per cent of number.
[2] Final, but not approved by General Accounting Office. Includes trespass.
[3] Includes receipts from Georgia, Maine, and South Carolina totaling $185.

TABLE 592.—*Free use timber: Cut from national forests, by States and districts, 1910, 1920, and 1928*

State	Fiscal year 1910		Fiscal year 1920		Calendar year 1928	
	Total quantity	Estimated users	Total quantity	Estimated users	Total quantity	Estimated users
	M ft. b. m.	*Number*	*M ft. b. m.*	*Number*	*M ft. b. m.*	*Number*
Alabama			1	12		
Alaska	184	6	4, 897	503	2, 006	508
Arizona	5, 254	1, 972	6, 418	4, 306	6, 642	4, 448
Arkansas	513	536	61	9	23	3
California	7, 647	3, 215	5, 238	1, 606	2, 805	2, 472
Colorado	12, 550	3, 598	9, 783	3, 920	9, 728	4, 241
Florida	95	32	330	96		
Georgia			10	8		
Idaho	19, 937	6, 472	14, 455	5, 530	16, 169	4, 700
Michigan			216	42	70	19
Minnesota	381	15	160	64	137	10
Montana	14, 713	5, 441	8, 151	4, 290	7, 852	3, 826
Nebraska			3	3		
Nevada	1, 710	678	1, 777	528	1, 744	439
New Mexico	10, 004	3, 801	8, 859	6, 472	7, 643	6, 163
North Carolina			17	12	746	313
North Dakota	21	62				
Oklahoma	123	192	180	600	55	60
Oregon	10, 068	2, 455	7, 515	1, 428	6, 949	1, 260
Pennsylvania					7	3
South Dakota	3, 476	1, 185	2, 963	910	1, 234	434
Tennessee			1, 027	385	985	435
Utah	8, 260	3, 426	8, 553	4, 985	9, 637	7, 108
Virginia			148	97	427	225
Washington	2, 444	503	1, 026	251	751	195
West Virginia			8	3	13	5
Wyoming	7, 416	1, 775	6, 264	1, 276	6, 819	1, 298
Total	104, 796	35, 364	88, 060	37, 336	82, 442	38, 165
SUMMARY BY ADMINISTRATIVE DISTRICTS						
District:						
1	(1)	(1)	8, 865	4, 510	8, 209	3, 985
2	(1)	(1)	16, 443	5, 658	13, 899	5, 304
3	(1)	(1)	15, 273	10, 775	14, 233	10, 590
4	(1)	(1)	27, 021	11, 383	31, 389	12, 867
5	(1)	(1)	5, 238	1, 606	2, 805	2, 472
6	(1)	(1)	13, 438	2, 182	7, 700	1, 455
7	(1)	(1)	1, 782	1, 222	2, 201	984
8	(1)	(1)	(2)	(2)	2, 006	508

Forest service.

[1] Not combined by districts previous to 1918.
[2] Included in district 6.

TABLE 593.—*County extension agents: Number employed, United States, 1928 and 1929*

Kind of extension agent	Number employed June 30, 1928	Number employed June 30, 1929
County agricultural agents	2, 318	2, 452
Negro agents (men)	160	172
Total	2, 478	2, 624
County home demonstration agents	941	1, 167
Negro agents (women)	108	125
Total	1, 049	1, 292
County club agents	145	252
Negro agents (club)	3	2
Total	148	254
Grand total, all agents	3, 675	4, 170

Extension service.

TABLE 594.—*Adult result demonstrations and junior projects completed and improved practices adopted, 1926–1928, as reported by all county extension agents*

Project	Adult result demonstrations			Junior projects completed [1]			Better practices adopted		
	1926	1927	1928	1926	1927	1928	1926	1927	1928
Soils	47, 708	48, 754	60, 135				257, 588	279, 774	306, 491
Cereals	38, 587	41, 712	40, 339	24, 107	25, 789	26, 997	261, 621	309, 692	250, 913
Legumes and forage	64, 516	72, 539	71, 483	4, 988	5, 253	6, 137	225, 287	241, 956	226, 171
Potatoes, cotton, and other special crops	34, 178	35, 132	40, 655	30, 458	25, 228	36, 475	179, 639	166, 909	205, 228
Horticulture	80, 364	98, 841	105, 957	81, 494	88, 922	112, 296	294, 007	344, 836	354, 516
Forestry	2, 286	3, 358	4, 510	730	2, 192	2, 719	10, 074	15, 807	18, 902
Dairy	17, 797	22, 571	29, 815	19, 094	23, 076	29, 468	418, 345	429, 105	461, 888
Animal husbandry	16, 375	19, 793	19, 605	37, 409	44, 341	48, 233	171, 533	198, 516	223, 554
Poultry	43, 759	50, 102	55, 443	52, 730	56, 756	56, 900	227, 352	259, 222	260, 648
Agricultural engineering	19, 091	21, 749	24, 152				120, 200	151, 478	140, 460
Rodents and insects	17, 469	22, 208	19, 591				265, 255	259, 321	220, 956
Agricultural economics				6, 139	4, 925	8, 361	492, 176	492, 495	526, 700
Foods	90, 827	98, 719	128, 497	131, 121	142, 302	167, 058	325, 455	397, 517	404, 517
Nutrition	37, 335	43, 931	47, 027	39, 071	54, 451	62, 790	168, 029	168, 293	211, 991
Clothing	55, 387	81, 126	74, 644	133, 501	146, 181	162, 291	299, 221	297, 245	320, 202
Home management	19, 823	30, 950	33, 941	10, 215	13, 822	16, 309	74, 038	106, 677	99, 156
House furnishings	25, 944	33, 093	35, 052	24, 834	30, 024	36, 274	106, 789	126, 417	141, 034
Home health and sanitation	17, 657	23, 421	25, 387	40, 857	56, 352	59, 342	128, 580	164, 804	179, 687
Miscellaneous	15, 681	24, 186	35, 293	37, 249	56, 415	51, 145	79, 305	108, 673	109, 083
Total	644, 784	772, 185	851, 526	673, 997	776, 029	882, 795	4, 104, 494	4, 518, 737	4, 662, 097

Extension service.

[1] Boys' and girls' club members completing.

TABLE 595.—*4-H club work: Number of clubs, enrollment, etc., 1925–1928*

Item	1925	1926	1927	1928
Junior clubs	41, 286	41, 234	44, 188	46, 671
Different boys enrolled	224, 633	234, 078	249, 553	270, 534
Different girls enrolled	340, 413	352, 078	370, 159	393, 406
Total enrollment	565, 046	586, 156	619, 712	663, 940
Different boys completing	133, 076	145, 202	153, 324	175, 069
Different girls completing	196, 498	223, 103	245, 783	272, 510
Total completing	329, 574	368, 305	399, 107	447, 579
Projects started	1, 079, 604	1, 161, 024	1, 330, 239	1, 466, 584
Projects completed	589, 440	673, 997	776, 029	882, 795

Extension service.

TABLE 596.—*Cooperative extension work: Projects and percentage of agents' and specialists'[1] time devoted to each, 1924–1928*

Project	1924	1925	1926	1927	1928
Soils	4. 7	5. 2	5. 3	4. 8	5. 1
Farm crops	12. 9	13. 1	13. 1	12. 4	11. 5
Horticulture	6. 4	6. 9	7. 3	7. 1	7. 3
Forestry	. 4	. 5	. 7	. 9	1. 0
Animal husbandry	8. 6	7. 1	7. 5	8. 2	7. 8
Dairy husbandry	6. 7	7. 0	7. 1	7. 9	8. 7
Poultry husbandry	8. 6	8. 7	9. 0	8. 8	8. 1
Rural engineering	3. 3	3. 7	3. 6	3. 4	3. 3
Rodents and insects	1. 6	2. 0	1. 7	1. 5	1. 3
Agricultural economics	4. 0	3. 9	4. 0	4. 1	4. 0
Foods	4. 4	4. 8	4. 6	4. 6	4. 4
Nutrition	2. 7	2. 3	2. 6	2. 5	2. 6
Clothing	7. 4	7. 9	7. 1	6. 8	6. 8
Home mangement	1. 4	1. 7	1. 5	1. 5	1. 7
House furnishing	1. 1	1. 2	1. 8	2. 0	2. 4
Home health and sanitation	1. 4	1. 2	1. 2	1. 2	1. 2
Community activities	8. 1	6. 2	5. 9	6. 0	5. 8
Miscellaneous	16. 3	16. 6	16. 0	16. 3	17. 0

Extension service.

[1] Only field work of specialists as reported by county extension agents is included.

TABLE 597.—*Temperature: Normal*[1] *and 1929, by months, at selected points in the United States*

Station	January		February		March		April		May		June		July		August		September		October		November		December		Annual	
	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929
	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.	° F.
Greenville, Me	12.5	11.4	13.1	15.8	24.6	27.0	37.0	36.2	49.3	51.3	58.8	60.0	65.2	63.9	61.8	61.2	55.0	56.3	45.0	43.1	31.1	31.0	17.9	15.6	39.3	39.4
Burlington, Vt	18.8	18.3	19.4	19.0	29.1	32.8	43.3	42.6	56.5	54.2	65.7	64.4	70.3	67.6	67.9	63.6	60.3	60.6	49.2	46.9	36.3	36.6	24.4	20.4	45.1	43.9
Boston, Mass	27.9	29.0	28.8	31.7	35.6	41.4	46.4	47.1	57.1	61.0	66.5	68.4	71.7	72.6	69.9	69.3	63.2	65.2	53.6	53.2	42.0	44.7	32.5	32.6	49.6	51.4
Buffalo, N. Y	24.6	23.7	24.3	22.4	31.1	38.1	42.8	43.8	54.6	52.8	64.4	63.6	69.8	68.9	68.6	65.8	62.4	63.1	51.9	49.5	39.4	38.5	29.8	27.4	47.0	46.5
Canton, N. Y	16.3	17.2	18.0	14.9	27.7	32.7	42.5	43.5	56.2	53.6	65.1	63.2	68.9	67.2	66.6	62.8	59.3	61.2	47.2	45.3	33.9	35.0	22.7	17.3	43.7	42.8
Trenton, N. J	30.5	31.7	30.7	33.0	39.1	46.0	49.8	52.2	61.1	61.6	69.5	70.8	74.5	74.6	73.0	70.8	66.9	67.8	55.6	53.2	44.4	45.3	34.4	35.0	52.5	53.5
Pittsburgh, Pa	30.7	28.0	32.3	28.6	39.6	46.4	51.2	53.4	62.4	59.5	70.7	68.7	74.6	73.0	72.9	68.2	66.4	67.1	55.7	52.2	43.2	41.0	34.2	34.6	52.8	51.7
Scranton, Pa	26.6	27.2	27.3	28.3	35.7	42.4	48.1	50.0	59.4	58.2	67.8	67.8	71.7	71.6	69.8	67.3	62.9	65.6	51.9	50.2	40.5	41.6	30.7	33.4	49.4	50.3
Cincinnati, Ohio	30.3	29.2	32.8	27.8	40.9	49.2	52.4	56.6	63.1	60.6	71.2	69.4	75.1	74.4	73.6	71.0	67.1	67.1	55.7	54.1	42.5	40.8	33.4	34.4	53.2	52.9
Cleveland, Ohio	26.5	25.0	27.4	25.2	34.6	43.6	46.2	50.6	57.9	56.4	67.1	65.8	71.4	72.5	70.0	68.0	63.9	65.6	53.6	52.2	40.9	39.4	31.2	32.0	49.2	49.7
Evansville, Ind	33.5	31.2	36.3	29.8	45.9	51.4	56.7	59.5	66.7	63.8	75.1	73.8	78.9	79.4	77.4	75.5	70.7	69.8	59.4	58.4	46.6	43.6	37.1	37.8	57.0	56.2
Indianapolis, Ind	28.4	25.0	31.1	25.6	40.0	47.2	52.1	55.0	62.9	59.4	71.6	69.6	75.7	75.5	73.7	72.4	66.9	66.4	55.7	53.4	42.3	39.2	32.2	31.7	52.7	51.7
Fort Wayne, Ind	26.4	21.4	26.5	23.1	38.0	44.5	48.6	52.2	59.3	57.4	68.6	66.8	73.6	74.0	71.6	69.3	65.2	63.8	53.8	50.4	40.9	36.7	29.5	28.6	50.2	49.0
Chicago, Ill	23.7	17.6	26.3	21.6	35.3	43.2	46.9	51.1	57.5	56.8	67.3	64.4	72.5	73.8	71.6	70.6	65.2	64.6	54.0	53.1	40.1	36.3	28.8	28.6	49.1	48.5
Peoria, Ill	23.1	17.8	25.9	21.2	37.0	45.4	50.9	53.6	61.7	59.4	70.9	68.6	75.4	75.3	72.5	71.6	64.3	65.2	52.0	53.0	37.5	35.8	28.1	28.2	49.9	49.6
Cairo, Ill	34.9	33.4	38.5	31.4	47.2	52.9	58.1	61.5	68.4	65.5	76.3	74.4	79.6	79.6	77.8	75.8	71.5	70.0	60.4	59.5	47.3	44.6	37.8	40.3	58.2	57.4
Grand Rapids, Mich	24.5	18.8	23.7	20.6	33.4	39.6	47.0	48.6	58.0	54.8	67.8	64.8	72.3	72.6	69.7	68.2	62.7	62.9	51.2	49.4	38.4	35.3	28.5	26.9	48.1	46.9
Alpena, Mich	19.1	15.7	18.0	14.6	25.5	33.0	38.6	40.7	50.5	47.8	60.4	58.4	65.9	66.8	64.1	62.4	57.6	57.6	47.1	46.2	34.4	32.3	24.8	23.4	42.2	41.6
Marquette, Mich	16.3	10.2	16.3	12.5	24.8	30.1	37.8	40.0	49.0	48.7	58.9	56.6	64.9	66.0	63.8	63.4	57.5	57.3	46.7	46.6	33.3	30.4	22.6	21.8	41.0	40.3
Madison, Wis	16.7	6.4	19.1	12.8	30.6	35.6	45.4	48.0	57.6	54.6	67.2	63.8	72.1	72.1	69.8	68.5	62.4	60.6	50.3	49.7	35.2	31.0	22.8	23.9	45.8	43.9
Green Bay, Wis	15.7	5.8	17.4	10.8	28.6	33.4	43.2	45.0	54.9	51.8	64.9	61.8	70.0	70.2	67.7	66.1	60.4	59.8	48.5	48.4	34.0	30.4	22.3	22.1	44.0	42.1
Duluth, Minn	7.9	−2.6	11.4	6.8	23.7	28.3	37.0	38.8	47.3	46.2	57.2	57.4	63.9	65.4	62.6	65.3	55.1	53.8	44.1	46.1	30.0	24.5	15.9	13.6	38.0	37.0
St. Paul, Minn	12.6	1.9	15.8	9.6	29.1	33.2	45.6	46.4	57.9	54.2	67.1	64.4	72.1	72.6	69.4	70.1	61.3	58.4	48.6	49.0	32.5	28.2	19.0	18.2	44.2	42.2
Des Moines, Iowa	20.1	11.6	23.7	15.2	35.9	40.8	50.1	53.0	61.3	59.2	70.6	69.0	75.4	75.3	73.1	73.4	65.6	63.8	53.4	53.6	38.4	33.8	26.0	26.9	49.5	48.0
Dubuque, Iowa	19.1	9.6	22.2	14.0	34.0	38.6	48.6	51.0	60.3	56.8	69.4	66.4	74.1	74.0	71.7	70.4	64.0	62.6	51.9	50.7	37.0	32.3	24.7	25.6	48.1	46.0
St. Louis, Mo	31.1	27.6	34.8	28.8	44.1	50.8	56.1	58.2	67.0	62.2	75.0	72.8	78.8	79.8	77.5	76.4	70.5	68.7	58.8	58.4	45.4	41.5	34.9	37.5	56.2	55.2
St. Joseph, Mo	27.5	18.2	31.6	21.8	42.5	46.4	53.8	56.4	64.2	61.4	73.7	71.4	78.6	78.2	76.7	77.0	68.8	66.6	56.7	56.8	43.6	36.1	30.2	31.6	54.0	51.8
Springfield, Mo	33.5	29.4	35.2	26.5	45.2	49.4	56.0	58.9	64.5	61.1	72.5	71.0	76.8	78.2	75.7	77.0	68.9	68.5	58.2	58.6	45.7	39.7	36.2	39.6	55.7	54.8
Bismarck, N. Dak	7.8	−2.9	10.3	4.6	24.2	32.2	42.1	43.2	54.5	51.2	63.7	62.9	69.8	73.6	67.3	70.6	58.1	53.1	44.9	48.6	28.5	27.9	14.7	13.6	40.5	39.9
Devils Lake, N. Dak	1.8	−7.1	5.1	1.4	19.8	28.6	38.8	39.8	52.6	47.2	61.9	60.7	67.4	68.5	64.8	67.1	55.9	50.8	42.4	44.5	24.5	20.8	9.5	7.6	37.0	35.8
Pierre, S. Dak	16.0	5.5	18.6	12.0	31.5	38.6	46.8	47.7	58.0	56.6	68.5	67.4	75.3	78.5	72.8	77.6	63.8	58.1	49.8	51.7	33.6	31.4	21.8	22.4	46.4	45.6
North Platte, Nebr	22.9	19.0	26.6	18.7	36.6	40.4	48.6	50.4	58.7	57.5	67.5	68.6	72.9	77.6	70.8	77.0	62.1	59.2	49.7	52.6	36.6	33.0	26.7	31.3	48.3	48.8
Omaha, Nebr	21.9	13.6	25.5	18.6	37.0	42.4	51.2	54.2	62.4	60.8	71.6	70.6	76.7	77.0	74.4	75.8	66.8	63.6	54.3	55.0	38.5	33.8	26.4	27.8	50.6	49.4
Concordia, Kans	26.4	20.6	29.8	22.6	41.0	46.1	53.5	55.9	63.2	60.0	73.0	71.4	78.0	78.6	76.5	78.2	68.3	65.8	55.9	56.1	41.4	35.0	30.7	32.3	53.1	51.9
Dodge City, Kans	29.0	26.0	33.2	24.4	42.8	46.4	53.6	56.6	63.5	61.1	72.5	72.7	78.4	79.1	77.7	79.2	69.4	66.8	56.1	56.4	42.6	34.0	32.6	36.0	54.3	53.2
Iola, Kans	29.8	26.2	33.2	26.8	44.5	49.4	56.2	58.0	65.2	61.6	74.1	72.4	78.2	78.6	77.1	79.2	69.8	68.9	57.8	59.4	44.1	38.6	33.9	35.6	55.3	54.6
Washington, D. C	33.4	34.9	35.3	35.0	42.6	50.2	53.3	57.6	63.7	64.5	72.2	72.4	76.8	76.9	75.0	74.4	68.1	70.2	57.4	55.6	45.2	47.6	36.6	38.6	55.0	56.5
Lynchburg, Va	37.5	37.2	40.3	38.2	47.3	52.8	57.3	59.6	67.3	65.3	74.6	72.6	77.5	76.0	75.6	73.2	69.0	70.0	58.5	55.8	47.2	48.0	39.5	40.9	57.6	57.5
Norfolk, Va	40.6	42.2	42.7	41.3	48.2	54.4	56.8	61.6	66.2	66.6	74.4	73.4	78.7	77.0	77.4	76.7	71.6	72.0	62.5	61.1	51.4	53.1	43.1	45.4	59.5	60.4
Parkersburg, W. Va	32.5	31.2	34.2	30.2	42.8	48.4	53.4	57.2	63.8	61.6	71.4	69.9	75.4	74.8	73.9	70.2	67.3	68.0	56.1	54.6	43.8	43.2	35.2	37.4	54.2	53.9
Lexington, Ky	32.9	32.0	35.4	29.2	43.7	49.4	54.3	57.8	64.3	62.2	72.2	70.6	75.9	75.0	74.5	72.4	68.5	68.2	57.4	55.1	44.8	41.8	35.8	36.3	55.0	54.2

Charlotte, N. C.	41.2	43.2	43.9	42.5	50.4	55.8	59.8	63.6	68.9	68.7	75.5	75.0	78.4	77.6	77.1	76.7	71.5	71.2	61.7	59.0	50.6	51.7	43.0	46.6	60.2	61.0
Wilmington, N. C.	46.5	49.8	47.9	47.3	53.3	58.9	62.0	65.4	70.8	69.6	76.8	75.0	79.1	78.0	77.6	77.5	73.1	73.6	65.3	64.1	56.0	57.0	49.1	49.3	63.1	63.8
Charleston, S. C.	49.9	53.0	52.4	51.1	57.4	61.4	64.5	68.1	72.7	72.0	78.9	76.6	81.4	79.8	81.0	80.7	76.6	75.9	67.8	67.0	58.1	60.0	51.7	50.7	66.0	66.4
Greenville, S. C.	40.3	43.3	43.3	42.8	49.9	55.1	58.6	63.2	67.2	67.4	74.1	74.3	76.9	77.2	75.8	77.2	70.6	70.4	60.2	59.4	49.6	51.3	42.2	44.4	59.1	60.5
Atlanta, Ga.	42.6	45.2	45.3	43.6	52.0	56.8	61.0	64.6	69.9	68.8	76.0	75.0	78.1	77.8	77.0	78.3	72.4	71.3	63.0	59.6	52.1	51.8	44.7	43.7	61.2	61.4
Thomasville, Ga.	51.0	55.8	55.0	55.2	60.2	64.5	66.7	70.5	74.0	74.0	79.5	77.6	81.8	79.2	81.0	80.3	76.8	76.6	68.2	67.4	58.5	60.9	52.5	51.5	67.1	67.8
Jacksonville, Fla.	55.4	59.5	58.0	59.1	62.6	66.8	68.7	71.4	75.0	74.6	79.9	77.6	82.1	79.6	81.7	80.8	78.3	77.2	71.1	70.4	62.2	65.0	56.3	55.2	69.3	69.8
Miami, Fla.	66.5	70.4	67.1	71.6	70.2	72.9	72.8	75.7	76.4	78.2	80.0	79.4	81.0	80.1	81.4	81.8	80.1	81.0	77.0	75.2	71.8	76.0	68.0	68.6	74.4	75.9
Memphis, Tenn.	40.9	40.1	44.3	37.0	52.3	56.2	61.8	64.2	70.6	68.8	77.6	77.4	80.7	81.2	79.4	78.6	73.6	73.8	63.3	63.0	51.7	48.0	43.6	45.4	61.6	61.2
Nashville, Tenn.	38.6	39.2	41.6	35.4	49.2	54.1	59.0	62.4	68.2	66.6	75.6	74.3	79.1	79.2	77.8	77.1	71.8	71.6	61.0	59.4	49.0	46.8	41.0	42.2	59.3	59.0
Birmingham, Ala.	45.1	47.8	48.0	44.2	55.4	59.4	63.3	65.8	71.1	70.0	77.9	76.5	80.2	79.8	79.2	80.6	74.8	74.5	64.8	62.4	53.9	52.6	46.4	45.8	63.3	63.3
Mobile, Ala.	51.5	53.6	54.7	51.9	59.7	63.6	66.3	71.1	74.4	74.8	80.3	79.6	81.4	81.6	81.0	81.9	78.1	76.9	69.3	68.4	58.6	58.4	52.2	50.1	67.3	67.7
Meridian, Miss.	47.0	49.8	49.6	45.8	57.1	60.8	64.0	67.6	71.3	72.6	78.1	77.0	80.4	80.2	79.5	80.4	74.5	75.0	64.3	64.0	54.2	53.8	47.7	47.0	64.0	64.5
Vicksburg, Miss.	48.2	49.7	51.8	44.5	58.5	61.2	65.6	68.1	72.9	72.5	79.0	78.2	81.3	81.2	80.8	80.6	76.3	75.8	66.7	66.4	56.6	51.8	50.0	49.0	65.6	64.9
New Orleans, La.	54.2	56.6	57.3	53.8	62.8	66.2	68.8	73.3	75.4	76.2	80.6	81.4	82.4	81.6	82.2	83.5	79.2	78.6	71.0	71.2	61.6	59.6	55.6	53.2	69.3	69.6
Shreveport, La.	47.0	47.9	50.9	42.6	58.3	61.6	65.8	69.2	73.6	72.5	80.7	80.4	83.2	82.8	82.0	84.4	76.9	77.7	66.6	67.5	56.0	49.9	49.1	48.6	65.8	65.4
Amarillo, Tex.	35.3	36.4	38.1	30.6	46.9	48.9	55.8	60.0	64.1	61.8	72.8	75.1	76.8	78.8	75.7	79.2	69.3	68.2	57.7	60.2	45.5	37.4	37.0	41.3	56.3	56.5
Brownsville, Tex.	59.8	63.1	62.6	59.2	68.2	71.0	73.7	78.7	78.6	78.7	82.4	81.8	83.6	82.4	83.9	83.6	80.6	81.2	74.9	75.0	67.2	61.4	61.2	61.0	73.1	73.1
El Paso, Tex.	45.0	45.4	49.0	46.8	55.8	54.4	63.4	64.9	71.5	71.1	79.6	83.5	81.1	82.0	79.2	79.0	73.9	76.6	63.5	63.8	52.7	47.0	44.9	44.9	63.3	63.3
Fort Worth, Tex.	45.4	46.1	48.3	39.0	57.7	60.8	65.0	68.4	72.3	70.8	79.9	81.8	83.6	84.2	83.0	86.8	76.9	77.8	66.7	68.6	55.5	49.2	47.5	50.8	65.2	65.4
Galveston, Tex.	53.8	55.9	56.3	51.0	62.4	64.4	68.7	73.4	74.8	74.6	80.7	81.6	83.4	82.6	83.0	83.8	80.1	80.5	72.7	73.3	63.3	56.6	56.4	53.1	69.6	69.2
San Antonio, Tex.	52.3	53.8	55.4	50.0	62.8	65.8	69.1	72.8	75.1	74.7	81.0	81.7	83.8	81.9	83.5	85.1	79.0	80.3	70.5	72.0	60.3	55.0	53.7	54.6	68.9	69.0
Oklahoma City, Okla.	36.4	34.2	39.6	30.8	50.0	53.1	59.8	63.1	67.7	64.7	76.0	78.1	80.6	81.8	79.7	84.4	72.8	72.7	61.5	62.8	48.8	42.4	39.3	43.4	59.4	59.3
Little Rock, Ark.	41.4	38.8	44.9	36.6	53.0	56.8	62.1	64.7	70.3	67.7	77.4	77.0	80.9	82.3	79.8	81.6	74.1	74.5	63.6	64.1	52.1	47.6	44.2	46.1	62.0	61.5
Havre, Mont.	12.9	2.2	13.6	8.2	27.1	36.4	43.7	40.6	53.4	52.0	62.0	62.0	68.3	71.8	65.4	71.6	56.4	52.4	44.5	48.6	31.2	33.0	20.4	16.4	41.6	41.3
Miles City, Mont.	14.5	3.0	16.8	8.8	28.6	36.7	44.7	44.7	56.7	53.3	66.0	64.4	72.9	76.0	71.5	75.8	61.2	55.4	46.5	50.2	30.9	31.8	21.0	17.7	44.3	43.2
Kalispell, Mont.	20.4	10.2	23.3	14.6	32.9	35.8	43.6	40.4	51.4	50.9	57.7	57.4	64.1	66.2	62.8	67.9	53.5	51.6	43.5	45.4	32.4	31.0	24.9	28.4	42.5	41.6
Cheyenne, Wyo.	25.5	22.1	27.3	17.2	33.1	32.6	40.9	39.6	50.3	48.0	60.4	60.4	66.7	68.5	65.6	68.4	57.0	53.0	44.8	46.4	34.8	26.8	28.5	33.3	44.6	43.0
Sheridan, Wyo.	19.3	8.2	21.3	13.2	30.8	34.6	43.2	41.2	51.8	50.4	61.2	60.0	67.6	70.4	66.1	70.6	56.5	53.0	44.2	46.6	32.4	27.2	22.8	20.9	43.1	41.4
Pueblo, Colo.	29.9	29.6	32.9	25.8	41.6	42.6	50.1	51.0	59.2	59.0	69.0	71.0	74.2	76.8	72.7	74.4	64.6	63.8	52.0	52.8	39.4	32.8	31.5	35.0	51.4	51.2
Grand Junction, Colo.	24.0	19.5	32.9	23.2	43.6	41.6	52.4	49.2	61.1	60.0	71.4	71.8	77.7	78.0	75.4	76.4	66.2	64.7	52.8	54.2	39.3	35.0	27.5	31.1	52.0	50.4
Santa Fe, N. Mex.	28.8	28.9	33.1	27.2	39.7	37.8	46.7	47.1	55.7	54.2	64.8	66.2	69.0	68.8	67.4	66.8	60.9	60.6	50.4	49.6	38.9	32.6	30.7	33.2	48.8	47.8
Roswell, N. Mex.	39.2	39.7	42.5	37.4	51.3	49.8	60.6	60.6	69.4	65.2	76.3	76.2	78.9	77.7	76.6	77.4	70.3	70.9	59.5	60.2	48.1	40.6	41.2	40.9	59.5	58.0
Phoenix, Ariz.	51.2	50.1	55.1	53.0	60.7	60.4	67.0	66.2	75.0	78.0	84.5	86.4	89.8	92.0	88.5	89.6	82.7	84.0	70.6	74.7	59.7	57.9	52.0	56.4	69.7	70.7
Modena, Utah	26.7	25.7	31.0	23.8	38.2	38.8	46.0	42.2	53.5	55.2	63.3	62.9	70.6	72.4	69.2	70.7	60.0	60.0	48.0	50.4	36.4	35.5	28.1	35.3	47.6	47.6
Salt Lake City, Utah	29.2	26.4	33.8	27.3	41.7	40.3	49.6	46.4	57.4	58.2	67.4	67.4	75.7	78.4	74.5	77.0	64.4	61.8	52.5	54.8	41.1	38.4	31.9	38.4	51.6	51.2
Winnemucca, Nev.	28.6	27.4	33.5	29.2	40.0	39.2	46.7	42.2	53.9	55.6	62.8	61.6	70.6	73.2	69.3	73.2	59.2	57.0	48.3	50.8	38.4	36.0	30.0	39.0	48.4	48.7
Boise, Idaho	29.8	23.1	34.8	25.4	42.7	42.8	50.4	46.8	57.1	57.8	65.3	64.0	72.9	74.8	71.8	77.2	61.9	58.8	51.1	53.8	41.0	37.6	32.1	37.6	50.9	50.0
Seattle, Wash.	39.5	34.6	41.1	36.2	44.9	45.0	49.4	46.7	54.5	54.6	59.0	59.2	63.1	64.3	63.1	64.8	58.1	60.8	51.4	55.6	45.6	45.2	41.7	43.6	51.0	50.9
Walla Walla, Wash.	32.7	21.8	37.1	24.7	46.1	47.7	53.1	50.2	59.6	60.4	66.5	66.3	74.0	74.4	72.7	77.6	63.8	63.0	53.5	56.3	42.8	40.2	35.5	40.0	53.1	51.9
Portland, Oreg.	39.4	34.2	42.1	35.6	46.9	47.7	51.8	49.2	56.9	58.6	62.4	62.4	66.7	68.3	66.7	69.1	61.7	64.8	54.2	58.5	46.8	44.8	41.2	45.3	53.1	53.2
Roseburg, Oreg.	41.2	36.4	43.4	39.4	47.1	46.8	51.0	47.7	56.0	56.6	62.5	61.4	67.4	67.4	68.0	68.1	62.9	61.4	53.9	56.3	45.9	41.8	41.8	45.0	53.4	52.4
Eureka, Calif.	46.9	45.0	47.2	44.8	48.3	47.6	49.9	48.2	52.0	51.6	54.3	55.6	55.5	57.1	56.0	57.8	55.9	55.6	53.6	53.8	51.1	47.5	48.2	51.0	51.6	51.3
Fresno, Calif.	46.2	43.0	51.1	49.3	55.0	55.4	60.2	57.2	67.1	69.4	75.8	74.6	82.1	80.8	80.7	82.0	73.4	74.4	64.0	68.2	54.2	57.1	46.2	49.6	63.0	63.4
Los Angeles, Calif.	54.6	55.2	55.5	54.4	57.5	57.2	59.4	57.4	62.2	65.0	66.4	68.6	70.2	72.1	71.1	75.8	69.0	70.2	65.3	70.2	60.9	65.8	56.6	63.7	62.4	64.6
Sacramento, Calif.	45.8	41.2	50.1	49.0	54.3	54.1	58.1	54.4	63.3	64.5	69.4	71.2	73.2	73.6	72.9	75.1	69.3	70.4	62.9	65.4	53.6	56.3	46.2	49.4	59.9	60.4
San Diego, Calif.	54.3	54.4	55.1	53.2	56.7	55.6	58.5	57.5	60.8	62.7	63.9	65.2	67.2	69.4	68.7	72.0	67.1	68.2	63.7	66.7	59.7	62.1	56.0	60.3	61.0	62.3
San Francisco, Calif.	49.9	47.4	52.2	51.8	54.2	54.2	55.0	53.4	56.8	56.5	58.5	63.0	58.5	61.5	59.1	61.1	60.9	61.4	60.5	63.5	56.3	59.7	51.3	54.2	56.1	57.3

Weather Bureau.

[1] Normals are based on records of 30 or more years of observations.

TABLE 598.—*Precipitation: Normal*[1] *and 1929, by months, at selected points in the United States*

Station	January		February		March		April		May		June		July		August		September		October		November		December		Annual	
	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929	Normal	1929
	Ins.	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*	*Ins.*
Greenville, Me.	2.83	3.35	2.97	2.20	3.15	2.05	2.93	5.71	3.30	5.40	4.09	3.24	4.72	2.16	3.63	3.52	4.08	1.65	3.91	3.12	3.46	2.13	3.17	3.41	42.24	37.94
Burlington, Vt.	1.76	1.33	1.57	1.38	2.04	2.47	2.15	3.74	2.85	4.51	3.38	5.55	3.50	3.35	3.37	1.54	3.48	1.42	2.97	2.87	2.66	2.24	1.88	3.47	31.61	33.87
Boston, Mass.	3.61	3.82	3.37	3.78	3.57	2.80	3.34	7.52	3.18	2.82	2.89	2.30	3.49	1.35	3.62	2.22	3.14	.76	3.15	2.38	3.33	3.01	3.45	4.43	40.14	37.19
Buffalo, N. Y.	3.30	3.73	2.95	1.67	2.57	2.38	2.56	5.02	3.10	2.79	2.82	1.66	3.03	1.62	3.08	1.22	2.92	3.25	3.29	2.25	3.02	2.31	3.36	5.22	36.00	33.12
Canton, N. Y.	2.50	3.31	2.27	1.67	2.50	3.93	2.18	3.68	3.00	4.04	3.29	4.50	3.50	3.77	3.65	1.81	3.35	2.51	3.03	3.23	3.16	3.04	2.69	2.42	35.12	37.91
Trenton, N. J.	3.31	3.06	3.27	3.51	3.40	2.34	2.94	5.34	3.08	3.53	3.09	3.53	3.94	.63	4.75	2.64	3.40	7.14	2.78	3.51	2.73	2.24	3.35	3.08	10.04	40.55
Pittsburgh, Pa.	3.05	3.33	2.62	2.62	3.03	2.15	2.92	4.29	3.21	5.38	3.81	2.21	4.05	3.50	3.23	1.79	2.58	1.05	2.52	5.07	2.29	3.38	2.86	2.15	36.17	36.92
Scranton, Pa.	3.03	1.84	3.04	1.85	3.20	1.95	2.77	4.68	3.27	3.70	3.67	3.43	4.03	1.06	3.69	3.29	3.17	3.26	3.03	4.20	2.77	2.62	3.02	2.40	38.69	34.28
Cincinnati, Ohio	3.48	4.60	2.99	1.58	3.89	2.51	3.12	3.98	3.70	7.74	3.66	4.98	3.31	4.54	3.41	1.80	3.65	5.17	2.51	3.24	2.85	4.19	2.98	2.43	38.55	46.76
Cleveland, Ohio	2.51	5.23	2.51	1.98	2.71	3.54	2.44	5.26	3.12	3.41	3.12	4.17	3.45	6.30	2.77	1.98	3.33	1.62	2.78	2.68	2.64	2.92	2.44	2.68	33.82	41.77
Evansville, Ind.	3.74	4.61	3.24	3.26	4.19	2.52	3.90	3.84	3.86	6.27	3.50	2.39	3.42	2.56	3.36	3.38	3.31	6.50	2.82	1.68	3.74	2.38	3.54	3.51	43.16	42.90
Indianapolis, Ind.	2.95	4.74	2.73	1.47	3.93	3.24	3.62	4.28	3.89	8.46	3.62	5.36	3.34	5.44	3.31	2.49	3.40	2.03	2.78	3.66	3.35	2.15	2.98	4.14	39.90	47.46
Fort Wayne, Ind.	2.33	4.23	2.35	.73	3.22	3.57	3.07	4.49	3.85	4.69	3.57	2.30	3.60	4.95	3.11	2.62	3.06	2.35	2.60	3.91	2.88	2.61	2.58	3.27	36.22	39.72
Chicago, Ill.	1.90	3.93	2.14	.54	2.58	5.23	2.78	4.79	3.54	2.29	3.30	4.96	3.33	2.18	3.21	3.49	3.14	3.03	2.53	3.06	2.37	1.47	2.04	1.84	32.86	36.81
Peoria, Ill.	1.78	3.98	2.01	.58	2.73	4.57	3.38	4.56	4.06	5.03	3.77	4.44	3.58	5.76	3.12	3.02	4.03	1.04	2.29	3.89	2.37	1.72	1.77	1.07	34.89	39.66
Cairo, Ill.	3.76	4.98	3.13	4.20	3.75	3.54	3.72	2.97	3.71	5.19	3.83	3.76	3.07	1.28	3.02	3.29	2.89	5.44	2.76	1.08	3.68	2.51	3.40	4.12	40.72	42.36
Grand Rapids, Mich.	2.35	4.00	2.24	.66	2.48	2.06	2.77	5.61	3.44	6.31	3.48	2.18	2.92	2.30	2.61	.70	3.53	.99	2.81	3.40	2.77	1.29	2.57	2.71	33.97	32.21
Alpena, Mich.	1.89	2.86	1.71	.91	1.99	1.96	2.24	3.67	3.05	3.84	3.30	3.96	2.76	1.09	2.86	2.25	2.98	1.90	2.71	4.08	2.60	1.23	2.08	1.55	30.17	29.30
Marquette, Mich.	2.33	3.73	1.90	1.16	2.26	1.84	2.43	2.40	2.96	2.59	3.22	3.73	3.12	2.88	2.67	1.72	3.25	3.79	2.76	4.53	2.91	1.38	2.66	3.47	32.47	33.22
Madison, Wis.	1.38	3.31	1.50	1.48	2.07	2.30	2.77	4.33	3.85	1.31	3.76	4.35	3.88	8.02	3.21	.87	3.72	3.17	2.43	1.82	1.78	.58	1.63	.40	31.98	32.04
Green Bay, Wis.	1.54	2.54	1.56	1.58	2.04	2.11	2.65	6.47	3.52	1.70	3.70	3.75	3.46	2.04	3.18	1.70	3.52	2.38	2.54	1.86	2.16	.53	1.71	.91	31.58	27.57
Duluth, Minn.	.97	1.51	1.05	.37	1.54	1.79	2.06	1.61	3.25	1.97	3.91	2.77	3.76	3.41	3.18	.93	3.31	4.82	2.31	2.47	1.45	.59	1.15	.92	27.94	23.16
St. Paul, Minn.	.92	1.52	.92	.95	1.43	1.29	2.35	2.43	3.27	1.97	4.14	4.66	3.57	3.71	3.01	1.37	3.07	3.36	2.20	2.45	1.30	.32	1.06	.36	27.24	24.39
Des Moines, Iowa	1.07	2.70	1.12	2.06	1.78	1.11	2.91	4.38	4.56	2.18	4.76	2.42	3.50	3.72	3.52	2.82	3.67	4.67	2.50	2.74	1.43	1.87	1.22	.34	32.04	31.01
Dubuque, Iowa	1.30	3.13	1.38	1.00	2.03	2.41	2.85	3.47	4.22	1.39	4.31	4.69	3.94	1.47	3.24	1.83	4.01	1.55	2.48	2.10	1.70	.68	1.44	.54	32.90	24.26
St. Louis, Mo.	2.34	2.11	2.56	.88	3.38	5.33	3.81	6.99	4.34	10.09	3.82	3.65	2.98	2.67	2.99	3.40	3.46	1.71	2.72	4.99	2.83	1.41	2.21	3.07	37.44	46.30
St. Joseph, Mo.	1.05	2.96	1.38	1.57	2.04	1.98	3.02	6.93	4.24	3.72	4.94	6.71	3.68	3.61	3.50	2.09	3.87	1.94	2.69	6.05	1.63	1.62	.97	.18	33.01	39.36
Springfield, Mo.	2.34	2.53	2.35	1.55	3.39	2.97	3.86	3.94	5.19	9.77	4.68	4.78	4.21	1.01	4.09	2.97	3.52	2.37	3.05	5.55	2.79	1.10	2.31	1.61	41.78	40.15
Bismarck, N. Dak.	.45	.69	.44	.32	.89	1.61	1.52	1.87	2.32	2.37	3.35	1.09	2.24	1.06	1.82	.75	1.23	1.69	.94	1.82	.57	.25	.57	.81	16.34	14.33
Devils Lake, N. Dak.	.47	.41	.50	.12	.78	.76	1.52	1.54	2.03	2.17	3.56	5.26	2.57	3.41	2.48	1.55	1.63	2.73	1.25	2.12	.72	.78	.54	.87	18.05	21.72
Pierre, S. Dak.	.46	.95	.46	.59	.86	1.28	1.81	3.17	2.49	1.66	2.96	1.83	2.68	.79	2.09	.68	1.10	1.28	.82	2.92	.47	.58	.50	.08	16.70	15.81
North Platte, Nebr.	.39	.23	.53	.44	.86	.28	2.06	3.83	2.78	2.58	3.22	1.24	2.74	2.06	2.39	6.17	1.35	2.22	1.07	1.62	.47	.48	.53	.01	18.39	21.16
Omaha, Nebr.	.70	1.15	.89	2.20	1.37	.54	2.51	3.98	3.77	2.02	4.56	2.94	3.54	5.04	3.05	1.56	3.21	2.05	2.17	2.69	1.07	1.38	.93	.14	27.77	25.69
Concordia, Kans.	.61	.78	.88	.94	1.23	.06	2.36	5.09	4.18	3.56	4.41	4.12	3.78	1.98	2.91	1.33	2.60	2.96	1.97	3.82	.99	1.42	.63	.08	26.55	26.14
Dodge City, Kans.	.41	.56	.77	.72	.89	.48	1.94	1.67	2.89	2.61	3.30	2.73	3.14	5.51	2.67	1.58	1.90	2.61	1.30	.85	.73	2.53	.57	.05	20.51	21.90
Iola, Kans.	1.32	2.38	1.67	.77	2.62	1.55	3.49	6.19	4.70	8.05	5.47	4.07	3.75	2.77	3.49	.81	4.93	1.86	2.99	4.32	1.83	1.16	1.39	.54	37.65	34.47
Washington, D. C.	3.55	2.16	3.27	3.19	3.75	2.64	3.27	6.10	3.70	2.29	4.13	7.41	4.71	1.29	4.01	1.30	3.24	4.32	2.84	4.82	2.37	1.70	3.32	2.20	42.16	39.42
Lynchburg, Va.	3.43	2.38	3.15	2.75	3.54	3.22	2.95	5.76	3.63	3.06	3.79	5.00	4.21	2.21	3.78	3.99	3.31	2.20	3.15	5.21	2.33	2.82	3.26	1.87	40.53	40.47
Norfolk, Va.	3.10	1.81	3.22	4.24	3.77	2.80	3.23	1.06	3.81	7.90	4.22	3.35	5.75	4.09	5.22	2.64	3.23	3.87	3.04	5.66	2.16	3.66	3.34	1.83	44.09	42.91

Parkersburg, W. Va.	3.58	2.57	3.13	2.69	3.49	2.39	3.19	2.84	3.38	5.02	4.00	3.31	4.29	4.35	3.51	3.87	2.76	4.12	2.48	4.34	2.57	4.16	3.03	2.43	39.41	42.09
Lexington, Ky.	4.18	2.83	3.62	3.37	4.32	3.67	3.50	2.99	3.81	5.59	4.05	4.25	3.65	4.12	3.45	1.49	3.07	4.35	2.59	2.99	3.34	3.92	3.77	1.88	43.35	41.45
Charlotte, N. C.	4.00	2.58	4.18	8.58	4.17	7.09	3.31	3.35	3.63	5.90	4.22	5.88	5.10	3.52	5.07	2.78	2.99	3.01	2.95	6.47	2.57	4.31	3.86	3.54	46.05	57.01
Wilmington, N. C.	3.29	5.64	3.26	5.21	3.17	2.06	2.66	1.64	3.44	5.25	5.10	2.87	7.13	5.03	6.36	7.80	4.51	6.56	3.27	5.81	1.96	1.63	2.78	4.27	46.93	53.77
Charleston, S. C.	3.02	4.66	2.98	4.86	3.02	2.05	2.53	1.88	3.00	4.30	4.59	4.81	6.89	6.07	6.53	5.22	4.53	3.86	3.27	1.71	2.14	2.00	2.72	3.54	45.22	44.96
Greenville, S. C.	4.87	3.82	5.18	9.16	5.15	9.03	3.72	5.73	4.03	3.66	4.55	2.97	5.36	1.62	5.50	1.35	3.68	12.95	3.12	7.58	3.18	5.50	4.84	3.44	53.18	66.81
Atlanta, Ga.	4.95	4.22	4.79	9.21	5.30	13.28	3.61	6.16	3.47	6.10	3.74	3.68	4.65	2.31	4.45	1.49	2.99	10.19	2.59	3.04	3.03	6.26	4.70	1.77	48.27	67.71
Thomasville, Ga.	4.10	4.93	4.46	3.71	4.09	5.48	3.34	4.40	3.63	3.92	5.45	6.66	6.70	6.54	5.75	11.68	4.88	6.53	2.96	2.39	2.68	1.73	4.31	2.82	52.35	60.79
Jacksonville, Fla.	2.80	3.96	2.97	1.28	2.91	2.14	2.38	5.09	4.02	6.09	5.33	4.10	6.71	8.21	5.81	6.02	7.35	8.58	4.46	.83	1.98	.08	3.02	3.02	49.74	49.40
Miami, Fla.	2.52	1.03	1.83	.44	2.17	5.31	3.00	3.24	6.22	6.96	6.86	5.61	5.42	9.36	6.17	5.51	8.34	16.82	8.44	20.18	2.91	.89	1.69	9.03	55.66	84.38
Memphis, Tenn.	4.81	3.95	4.36	3.48	5.26	3.63	4.78	8.50	4.19	4.88	3.55	1.60	3.18	5.77	3.36	4.45	2.80	1.62	2.68	6.88	4.24	3.33	4.51	3.25	47.72	51.34
Nashville, Tenn.	4.76	3.85	4.13	3.81	5.11	6.48	4.13	3.93	3.87	6.46	4.00	2.02	3.88	6.59	3.71	.51	3.42	4.85	2.49	4.05	3.50	4.79	4.20	3.33	47.20	50.67
Birmingham, Ala.	5.52	5.69	5.06	6.33	5.70	13.14	4.81	6.85	3.95	10.20	4.46	4.88	5.17	4.34	4.26	2.01	3.38	5.98	2.42	4.74	3.31	14.69	5.14	2.97	53.18	81.82
Mobile, Ala.	4.85	6.47	5.33	9.13	5.98	20.23	4.63	3.58	4.32	5.21	5.43	11.83	6.89	3.11	6.92	6.88	5.00	5.26	3.60	4.49	3.64	8.23	5.02	4.92	61.61	89.34
Meridian, Miss.	5.32	6.44	5.45	5.75	5.23	13.70	4.78	2.73	4.32	5.55	4.55	5.88	4.89	2.24	4.54	.79	2.96	4.86	2.39	1.82	3.32	11.65	5.23	2.39	52.98	63.80
Vicksburg, Miss.	5.37	4.78	4.82	3.64	5.57	8.86	5.19	4.82	4.32	3.32	3.99	2.40	4.53	3.12	3.46	1.83	2.87	.34	2.77	2.55	3.71	8.31	5.33	2.89	51.93	46.86
New Orleans, La.	4.34	10.63	4.25	6.26	4.72	6.25	5.24	1.98	4.60	7.62	5.88	3.00	6.37	11.78	5.80	6.70	5.03	16.57	3.30	6.26	3.14	5.16	4.79	2.85	57.46	85.06
Shreveport, La.	3.93	3.21	3.29	2.54	4.11	3.08	4.63	3.09	4.22	3.48	3.50	.88	3.56	3.99	2.70	.50	2.80	5.62	2.69	1.30	3.65	1.99	4.29	6.25	43.37	35.93
Amarillo, Tex.	.51	.16	.71	.34	.71	1.84	1.83	T.	2.79	3.19	2.84	.77	2.84	1.76	3.08	4.54	2.30	1.97	1.66	3.28	.92	.91	.80	.11	20.99	18.87
Brownsville, Tex.	1.50	.46	1.21	.27	1.26	.26	1.43	.88	2.27	8.60	2.87	1.54	1.96	4.69	2.55	3.29	5.52	5.16	3.29	1.23	1.98	1.72	1.56	.62	27.40	22.42
El Paso, Tex.	.46	T.	.41	.29	.36	.21	.26	T.	.33	1.51	.58	.54	1.99	3.01	1.70	1.18	1.25	.12	.80	1.60	.50	.33	.52	.50	9.16	9.29
Fort Worth, Tex.	2.05	2.08	1.76	2.78	2.32	1.39	4.02	2.06	4.65	5.83	3.35	.20	2.61	.43	2.62	T.	2.49	2.29	2.81	2.12	2.58	1.50	1.87	.41	33.13	21.09
Galveston, Tex.	3.41	5.53	2.83	2.73	2.68	3.57	3.06	9.92	3.42	10.50	4.37	1.96	3.71	7.17	4.28	.94	5.57	.44	4.36	4.02	3.33	7.68	3.75	3.28	44.77	57.74
San Antonio, Tex.	1.46	2.21	1.65	.16	1.84	3.12	3.19	2.37	3.20	7.73	2.46	2.19	2.17	2.58	2.42	.01	3.05	2.02	2.23	1.60	1.90	3.17	1.61	2.08	27.18	29.24
Oklahoma City, Okla.	1.19	1.61	1.11	.93	1.98	5.05	3.29	2.08	4.88	6.67	3.67	1.60	2.86	3.37	2.89	.93	3.05	2.69	2.86	4.49	1.87	1.74	1.50	.57	31.15	31.73
Little Rock, Ark.	4.73	3.69	3.84	2.38	4.62	4.72	5.19	4.93	4.78	6.20	3.76	4.25	3.50	1.20	3.75	1.95	3.17	1.43	2.71	4.76	4.19	1.85	4.14	3.81	48.38	41.17
Havre, Mont.	.73	.61	.50	.23	.51	.85	.99	.69	2.04	1.90	2.86	2.50	1.87	.14	1.22	.26	1.29	1.46	.67	.67	.61	.29	.61	1.39	13.90	10.99
Miles City, Mont.	.66	.90	.49	.38	.86	1.72	1.12	.70	2.24	2.24	2.66	2.94	1.54	.70	1.08	.28	1.04	1.86	.90	1.05	.57	.49	.63	.55	13.79	13.81
Kalispell, Mont.	1.57	1.97	1.11	1.02	.95	.63	.80	.64	1.46	.69	2.06	.95	1.10	.31	.87	.14	1.24	.51	1.06	.51	1.35	.17	1.45	2.85	15.02	10.39
Cheyenne, Wyo.	.42	.32	.64	.85	1.02	1.51	1.99	4.79	2.43	1.46	1.61	.72	2.10	2.05	1.55	1.80	1.20	1.81	.96	1.47	.52	1.53	.55	.11	14.99	18.42
Sheridan, Wyo.	.85	.99	.70	.91	1.16	2.56	1.92	3.12	2.65	2.55	2.04	.95	1.22	.91	.91	.63	1.27	1.15	1.07	.71	.63	2.32	.64	.75	15.06	17.55
Pueblo, Colo.	.31	.19	.47	.78	.59	.30	1.31	.78	1.60	1.11	1.36	.15	1.94	1.22	1.82	4.44	.75	.51	.66	.79	.36	1.14	.50	.65	11.67	12.06
Grand Junction, Colo.	.60	.95	.58	.79	.76	1.02	.83	.49	.81	.45	.40	.08	.61	2.72	1.17	.99	.92	2.16	.95	.41	.57	.74	.63	.10	8.83	10.90
Santa Fe, N. Mex.	.67	.27	.75	.97	.80	.59	1.00	.15	1.26	5.58	1.08	.04	2.38	2.50	2.28	3.84	1.45	5.15	1.18	1.43	.68	.89	.74	.11	14.27	21.52
Roswell, N. Mex.	.53	.03	.57	.46	.74	.80	.89	T.	1.09	2.30	1.67	1.15	2.26	4.70	2.15	.85	2.11	.42	1.42	.58	.85	1.09	.66	.00	14.94	12.38
Phoenix, Ariz.	.80	.92	.77	.28	.68	.13	.40	.43	.12	.01	.07	T.	1.07	.79	.95	2.09	.75	.19	.47	.09	.70	.11	1.00	T.	7.78	5.04
Modena, Utah	.85	1.29	.95	.59	1.03	.68	.89	.99	.79	.09	.32	.01	1.08	1.06	1.29	2.06	.78	.49	.74	.11	.59	.00	.83	.01	10.14	7.38
Salt Lake City, Utah	1.31	1.53	1.51	1.34	1.98	1.96	2.05	3.97	1.92	.18	.80	.70	.51	.40	.85	.41	.98	2.45	1.44	.98	1.35	.12	1.43	.43	16.13	12.47
Winnemucca, Nev.	1.03	.59	.91	.58	.96	.55	.84	.93	.88	.06	.72	.28	.21	.01	.20	.06	.41	.06	.62	.01	.68	.00	1.08	.72	8.54	3.85
Boise, Idaho	1.73	2.49	1.44	.63	1.35	1.41	1.18	1.28	1.43	.14	.92	1.08	.24	T.	.19	.11	.53	.26	1.24	.13	1.28	.13	1.57	1.17	13.10	8.83
Seattle, Wash.	4.94	2.54	3.89	1.10	3.05	2.73	2.38	1.59	1.87	1.48	1.33	1.75	.63	.13	.70	1.13	1.77	.09	2.84	1.00	5.03	1.23	5.60	5.26	34.03	20.03
Walla Walla, Wash.	1.96	2.37	1.76	.39	1.61	.56	1.51	.57	1.61	.80	1.12	1.57	.39	T.	.49	.03	.95	.47	1.53	1.12	2.02	.11	2.06	3.20	17.01	11.19
Portland, Oreg.	6.60	3.50	5.36	.97	3.91	2.90	2.87	4.06	2.19	1.14	1.52	2.19	.61	.02	.64	.23	1.98	.31	3.12	1.33	6.10	.67	6.72	8.79	41.62	26.11
Roseburg, Oreg.	5.31	3.95	4.49	1.11	3.28	2.02	2.27	3.15	1.93	.65	1.09	2.67	.32	.01	.34	.01	1.27	.03	2.61	1.21	4.66	.25	5.34	7.94	32.91	23.00
Eureka, Calif.	7.11	4.31	6.48	2.06	5.23	2.31	3.33	2.61	1.80	.14	.72	2.39	.11	T.	.18	.01	1.01	.00	2.33	.21	5.18	T.	6.28	7.13	39.76	21.17
Fresno, Calif.	1.73	1.26	1.43	.62	1.58	1.53	.95	.69	.44	.01	.08	.28	.01	T.	.01	T.	.21	.01	.57	T.	.93	.00	1.45	.50	9.39	4.90
Los Angeles, Calif.	3.10	1.20	3.07	2.15	2.78	2.51	1.04	1.99	.45	T.	.08	.15	.01	.00	.02	.00	.17	.32	.68	T.	1.20	.00	2.63	.00	15.23	8.32
Sacramento, Calif.	3.72	.88	3.02	1.44	2.57	.78	1.51	.44	.77	.04	.15	1.02	.00	T.	.00	.00	.38	.00	.92	.15	1.88	.00	3.03	4.06	17.95	8.81
San Diego, Calif.	2.06	.90	2.03	1.14	1.72	1.22	.77	.57	.35	.05	.05	T.	.03	.00	.04	.00	.08	.26	.54	.00	.76	T.	1.87	.00	10.30	4.14
San Francisco, Calif.	4.54	1.32	3.85	2.14	3.14	1.56	1.61	1.01	.80	.01	.18	.86	.02	T.	.01	.00	.45	T.	1.12	.01	2.35	.00	3.95	3.09	22.02	10.00

Weather Bureau. T.=Trace, indicates an amount too small to measure. [1] Normals are based on records of 20 or more years of observations.

TABLE 599.—*Frost: Dates of killing frosts, with length of growing season*

Station	Date of last killing frost in spring, 1929	Date of first killing frost in fall, 1929	Averages and extremes for 30 to 50 years				
			Spring frosts		Fall frosts		Length of growing season between average dates of killing frosts
			Latest date of killing frost	Average date of last killing frost	Earliest date of killing frost	Average date of first killing frost	
							Days
Greenville, Me	May 23[1]	Sept. 21[1]	June 23	May 30	Aug. 26	Sept. 14	107
Portland, Me	Apr. 15[1]	Oct. 9	June 20	May 14	Sept. 11	Oct. 18	157
Concord, N. H	May 10[1]	Sept. 20	June 5	May 7	Sept. 6	Sept. 30	146
Northfield, Vt	May 23[1]	---do---	June 20	May 22	Aug. 27	Sept. 18	120
Boston, Mass	Apr. 14	Nov. 22	May 16	Apr. 14	Sept. 26	Oct. 24	193
Hartford, Conn	---do.[1]---	Oct. 10	May 22	Apr. 23	Sept. 16	Oct. 13	173
Albany, N. Y	Apr. 11	---do---	May 30	---do---	Sept. 15	Oct. 16	176
Buffalo, N. Y	Apr. 19	---do---	May 21	Apr. 28	Oct. 3	Oct. 21	176
Canton, N. Y	Apr. 29[1]	Sept. 19	June 2	May 8	Sept. 11	Sept. 28	143
Setauket, N. Y	Apr. 2[1]	----------	May 17	Apr. 16	Oct. 22	Nov. 10	208
Syracuse, N. Y	Apr. 11[1]	Sept. 21	May 5	Apr. 24	Sept. 21	Oct. 22	181
Atlantic City, N. J	Mar. 18[1]	Nov. 25	Apr. 30	Apr. 11	Oct. 1	Nov. 5	208
Trenton, N. J	---do.[1]---	Oct. 11	May 17	Apr. 20	Sept. 22	Oct. 19	182
Erie, Pa	Apr. 2[1]	Oct. 10	---do---	---do---	Oct. 9	Nov. 2	196
Harrisburg, Pa	Mar. 17	Oct. 11	May 12	Apr. 10	Oct. 3	Oct. 27	200
Pittsburgh, Pa	Apr. 19	Sept. 19	May 29	Apr. 21	Sept. 19	Oct. 22	184
Scranton, Pa	May 10	Oct. 9	May 10	Apr. 20	Sept. 14	Oct. 13	176
Cincinnati, Ohio	Mar. 17[1]	Nov. 5	Apr. 26	Apr. 14	Sept. 30	Oct. 25	194
Cleveland, Ohio	Apr. 2[1]	Nov. 20	May 21	Apr. 15	Oct. 2	Nov. 2	201
Columbus, Ohio	Apr. 19	Nov. 5	May 17	Apr. 17	Sept. 21	Oct. 18	184
Dayton, Ohio	---do---	---do---	May 11	Apr. 15	Oct. 9	Oct. 27	195
Toledo, Ohio	Apr. 18	Nov. 5	May 29	Apr. 22	Sept. 9	Oct. 18	179
Evansville, Ind	Mar. 10	---do---	Apr. 26	Apr. 6	Sept. 30	Oct. 27	204
Fort Wayne, Ind	Apr. 19	Sept. 19	May 28	Apr. 25	Sept. 14	Oct. 13	171
Indianapolis, Ind	Apr. 1[1]	Nov. 5	May 25	Apr. 16	Sept. 21	Oct. 19	186
Cairo, Ill	Mar. 10	---do---	Apr. 30	Mar. 31	Sept. 30	Oct. 29	212
Chicago, Ill	Apr. 1[1]	---do---	May 23	Apr. 18	Sept. 20	Oct. 18	183
Peoria, Ill	Apr. 1	Oct. 25	May 11	Apr. 15	Sept. 26	Oct. 19	187
Springfield, Ill	---do---	---do---	May 25	---do---	Sept. 25	---do---	187
Alpena, Mich	May 9	Sept. 19	June 9	May 13	Sept. 6	Sept. 30	140
Detroit, Mich	Apr. 18[1]	Nov. 5	May 31	Apr. 30	Sept. 21	Oct. 14	167
Grand Haven, Mich	Apr. 19	Oct. 28	May 28	May 1	Sept. 23	Oct. 17	169
Grand Rapids, Mich	May 2	Oct. 5	---do---	Apr. 28	---do---	---do---	172
Ludington, Mich	Apr. 19	Oct. 9	June 17	May 2	Sept. 4	Oct. 21	172
Marquette, Mich	May 18	Oct. 4	June 6	May 13	Aug. 23	Oct. 9	149
Green Bay, Wis	May 19	Sept. 18	May 30	May 5	Sept. 16	---do---	157
La Crosse, Wis	---do---	---do---	May 24	Apr. 28	Sept. 10	Oct. 10	165
Madison, Wis	---do---	Nov. 2	May 25	Apr. 25	Sept. 16	Oct. 17	175
Milwaukee, Wis	Apr. 2[1]	Nov. 5	May 29	Apr. 28	Sept. 25	Oct. 16	171
Duluth, Minn	May 18[1]	Sept. 18	June 14	May 7	Sept. 10	Oct. 4	150
Minneapolis, Minn	May 3	---do---	May 20	Apr. 26	Sept. 13	Oct. 10	167
Moorhead, Minn	May 20	---do---	June 8	May 13	Aug. 25	Sept. 24	134
Charles City, Iowa	May 9	---do---	May 21	Apr. 30	Sept. 12	Oct. 7	160
Des Moines, Iowa	Apr. 13	Oct. 25	May 31	Apr. 21	Sept. 13	Oct. 10	172
Dubuque, Iowa	Apr. 1[1]	Oct. 23	May 21	Apr. 20	Sept. 21	Oct. 15	178
Keokuk, Iowa	Apr. 1	Nov. 9	May 4	Apr. 14	Sept. 18	Oct. 13	182
Columbia, Mo	Mar. 10[1]	Oct. 25	May 9	Apr. 12	---do---	Oct. 14	185
St. Joseph, Mo	Apr. 12	Nov. 4	Apr. 28	Apr. 11	Sept. 26	---do---	186
St. Louis, Mo	Mar. 10[1]	Nov. 5	May 22	Apr. 4	Sept. 30	Oct. 28	207
Springfield, Mo	May 2[1]	Oct. 25	May 19	Apr. 14	---do---	Oct. 21	190
Bismarck, N. Dak	May 20	Sept. 18	June 7	May 11	Aug. 23	Sept. 20	132
Devils Lake, N. Dak	May 23	Sept. 17	---do---	May 16	Aug. 8	Sept. 19	126
Williston, N. Dak	May 15[1]	Sept. 8	June 16	May 15	Aug. 22	Sept. 20	128
Huron, S. Dak	May 16	Oct. 21	June 21	May 10	Aug. 23	Sept. 23	136
Pierre, S. Dak	---do---	Oct. 24	May 19	Apr. 30	Sept. 12	Oct. 5	158
Rapid City, S. Dak	May 8[1]	---do---	May 21	May 4	Sept. 13	Sept. 29	148
Yankton, S. Dak	May 16	Oct. 21	May 27	May 1	Sept. 14	Oct. 6	158
North Platte, Nebr	May 2	Oct. 23	May 24	---do---	Sept. 10	Sept. 30	152
Omaha, Nebr	Apr. 1[1]	---do---	May 19	Apr. 15	Sept. 18	Oct. 13	181
Valentine, Nebr	May 2	Oct. 24	June 21	May 6	Sept. 12	Oct. 1	148
Concordia, Kans	Apr. 12	Nov. 1	May 19	Apr. 17	Sept. 20	Oct. 17	182
Dodge City, Kans	Apr. 11[1]	Oct. 25	May 27	Apr. 21	Sept. 23	Oct. 21	183
Iola, Kans	Apr. 1	---do---	May 4	Apr. 7	Sept. 26	Oct. 23	199
Wichita, Kans	---do---	---do---	May 15	Apr. 10	Sept. 23	Oct. 25	198
Washington, D. C	Mar. 10[1]	Nov. 10	May 12	Apr. 8	Oct. 2	Oct. 20	195
Lynchburg, Va	Mar. 11[1]	---do---	May 7	Apr. 28	---do---	Oct. 27	182
Norfolk, Va	Mar. 11	Nov. 30	Apr. 26	Mar. 25	Oct. 11	Nov. 17	237
Richmond, Va	Mar. 10	Nov. 22	---do---	Apr. 7	Oct. 12	Oct. 31	207
Wytheville, Va	Apr. 23	Nov. 6	May 15	Apr. 15	Sept. 19	Oct. 13	181
Elkins, W. Va	---do---	Oct. 9	May 26	May 8	Sept. 20	Oct. 8	153
Parkersburg, W. Va	Apr. 19	Oct. 18	May 22	Apr. 16	Oct. 1	Oct. 16	183
Asheville, N. C	Mar. 18	Nov. 5	May 10	Apr. 15	Oct. 3	Oct. 20	188
Charlotte, N. C	Mar. 11	Nov. 30	Apr. 26	Mar. 28	Oct. 8	Nov. 5	222
Raleigh, N. C	Mar. 10	Nov. 22	---do---	Mar. 29	---do---	---do---	221
Wilmington, N. C	Mar. 11[1]	Nov. 30	May 1	Mar. 23	Oct. 16	Nov. 13	235
Charleston, S. C	Feb. 14[1]	---do---	Apr. 2	Feb. 20	Nov. 8	Dec. 10	293

[1] Temperature 32° F. or below.

TABLE 599.—*Frost: Dates of killing frosts, with length of growing season*—Contd

Station	Date of last killing frost in spring, 1929	Date of first killing frost in fall, 1929	Averages and extremes for 30 to 50 years: Spring frosts: Latest date of killing frost	Averages and extremes for 30 to 50 years: Spring frosts: Average date of last killing frost	Averages and extremes for 30 to 50 years: Fall frosts: Earliest date of killing frost	Averages and extremes for 30 to 50 years: Fall frosts: Average date of first killing frost	Length of growing season between average dates of killing frosts
							Days
Columbia, S. C	Mar. 10	Nov. 30	Apr. 17	Mar. 18	Oct. 30	Nov. 18	245
Greenville, S. C	Mar. 10	Nov. 22	Apr. 24	Apr. 3	Oct. 10	Nov. 2	213
Atlanta, Ga	Mar. 18	Nov. 29	Apr. 17	Mar. 31	Oct. 11	Nov. 7	221
Augusta, Ga	Feb. 14[1]	Nov. 30	do	Mar. 22	Oct. 21	Nov. 10	233
Macon, Ga	Feb. 23	do	Apr. 18	Mar. 23	Oct. 11	Nov. 7	229
Savannah, Ga	Feb. 2	do	Apr. 13	Feb. 26	Oct. 25	Nov. 24	271
Thomasville, Ga	Feb. 12	do	Apr. 26	Mar. 14	Oct. 21	Nov. 15	246
Apalachicola, Fla	Jan. 7	Nov. 20	Mar. 23	Feb. 14	Nov. 13	Dec. 7	296
Avon Park, Fla	None.		Feb. 25	Jan. 12	Nov. 14	Dec. 26	348
Jacksonville, Fla	do	Nov. 30	Apr. 10	Feb. 16	Nov. 12	Dec. 6	293
Miami, Fla	do	None.	Feb. 19	(2)	Dec. 26	(2)	(2)
Tampa, Fla	do	do	Apr. 7	Jan. 26	Nov. 21	Jan. 3[3]	342
Chattanooga, Tenn	Mar. 10[1]	Nov. 21	May 14	Apr. 2	Sept. 30	Oct. 26	207
Knoxville, Tenn	Mar. 18	Nov. 6	Apr. 26	do	Oct. 1	Oct. 28	209
Memphis, Tenn	Mar. 10	do	Apr. 25	Mar. 22	Oct. 2	Nov. 3	226
Nashville, Tenn	do	do	Apr. 24	Apr. 2	Oct. 8	Oct. 27	208
Birmingham, Ala	do	Nov. 30	Apr. 20	Mar. 16	Oct. 21	Nov. 9	238
Mobile, Ala	Feb. 12	do	Apr. 6	Feb. 17	Oct. 31	Dec. 5	291
Montgomery, Ala	do[1]	do	Apr. 5	Mar. 10	Oct. 21	Nov. 11	246
New Orleans, La	Feb. 12	Nov. 23	Mar. 27	Jan. 25	Nov. 11	Dec. 16	325
Shreveport, La	Feb. 21[1]	Nov. 22	Apr. 9	Mar. 6	Oct. 20	Nov. 10	249
Abilene, Tex	Feb. 23	Oct. 24	Apr. 23	Mar. 21	Oct. 19	do	234
Amarillo, Tex	Mar. 18	do	May 23	Apr. 17	Sept. 22	Oct. 29	195
Brownsville, Tex	None.	Dec. 23	Mar. 8	Jan. 28	Nov. 15	Dec. 22	328
Corpus Christi, Tex	Feb. 11	Dec. 22	Mar. 19	Jan. 21	Nov. 29	Dec. 28	341
Del Rio, Tex	Feb. 12	Nov. 16	Mar. 27	Feb. 28	Oct. 27	Nov. 17	262
El Paso, Tex	Mar. 16	Nov. 10	Apr. 26	Mar. 14	do	Nov. 15	246
Fort Worth, Tex	Feb. 22[1]	Nov. 21	Apr. 9	Mar. 11	Oct. 22	Nov. 12	246
Galveston, Tex	Feb. 11[1]	None.	Mar. 1	Jan. 19	Nov. 16	Dec. 26	341
Palestine, Tex	Feb. 23[1]	Nov. 22	Apr. 5	Mar. 13	Oct. 20	Nov. 13	245
San Antonio, Tex	Feb. 12	Nov. 23	do	Feb. 24	Oct. 30	Nov. 28	277
Taylor, Tex	Mar. 2[1]	do	do	Mar. 13	do	Nov. 22	254
Oklahoma City, Okla	Mar. 1	Nov. 19	Apr. 30	Mar. 31	Oct. 7	Nov. 2	216
Fort Smith, Ark	Mar. 10	Nov. 5	Apr. 17	Mar. 21	Oct. 9	Nov. 6	230
Little Rock, Ark	do	do	Apr. 26	Mar. 18	Oct. 22	Nov. 14	241
Havre, Mont	May 18	Sept. 6	June 6	May 16	Aug. 25	Sept. 19	126
Helena, Mont	May 15	Oct. 11	June 9	May 9	do	Sept. 28	142
Kalispell, Mont	do	Sept. 6	June 7	May 5	Sept. 6	Oct. 2	150
Miles City, Mont	May 6	Oct. 23	May 31	do	Sept. 7	do	150
Cheyenne, Wyo	May 12	Oct. 22	June 13	May 20	Aug. 25	Sept. 19	122
Lander, Wyo	June 20	Sept. 6	June 18	May 19	Aug. 23	Sept. 18	122
Sheridan, Wyo	May 29	Sept. 9	June 6	May 20	Aug. 25	Sept. 20	123
Yellowstone Park, Wyo	do	Sept. 4	June 22	May 21	do	Sept. 16	118
Denver, Colo	Apr. 26	Oct. 22	June 6	May 4	Sept. 12	Oct. 8	157
Grand Junction, Colo	Apr. 11	Oct. 23	May 14	Apr. 19	Sept. 14	Oct. 19	183
Pueblo, Colo	May 2	Oct. 24	June 2	Apr. 27	Sept. 12	Oct. 8	164
Roswell, N. Mex	do	do	May 7	Apr. 12	Oct. 10	Oct. 27	198
Santa Fe, N. Mex	do	Oct. 23	May 18	Apr. 25	Sept. 25	Oct. 18	176
Flagstaff, Ariz	May 28		June 17	May 31	Sept. 12	Sept. 24	116
Phoenix, Ariz	Feb. 10	Nov. 14	Mar. 31	Feb. 16	Nov. 5	Dec. 3	290
Tucson, Ariz	Mar. 16[1]		Apr. 6	Mar. 11	Oct. 22	Nov. 9	243
Yuma, Ariz	Jan. 27	None.	Feb. 18	Jan. 2	Nov. 30	Dec. 25	357
Modena, Utah	June 2[1]	Oct. 24	July 3	May 23	Sept. 5	Sept. 26	126
Salt Lake City, Utah	Apr. 11[1]	Oct. 28	June 18	Apr. 20	Sept. 22	Oct. 20	183
Reno, Nev	June 2	Oct. 3	June 13	May 13	Sept. 6	Oct. 3	143
Winnemucca, Nev	May 28	Oct. 24	June 22	May 16	Aug. 22	Sept. 26	133
Boise, Idaho	Apr. 12	Oct. 11	June 16	Apr. 27	Sept. 11	Oct. 12	168
Lewiston, Idaho	Apr. 2	Oct. 25	May 10	Apr. 5	Sept. 21	Oct. 25	203
Pocatello, Idaho	May 6	Sept. 8	June 1	May 1	Sept. 8	Oct. 6	158
Seattle, Wash	Mar. 14	Nov. 11	May 10	Mar. 17	Oct. 18	Nov. 21	249
Spokane, Wash	Apr. 18	Oct. 29	June 8	Apr. 14	Sept. 7	Oct. 13	182
Walla Walla, Wash	Apr. 1	do	Apr. 28	Mar. 30	Sept. 28	Nov. 5	220
Baker, Oreg	May 10	Sept. 21	June 23	May 8	Aug. 30	Sept. 30	145
Portland, Oreg	Feb. 18[1]	Nov. 13	May 2	Mar. 18	Oct. 13	Nov. 19	246
Roseburg, Oreg	Mar. 29	Oct. 29	May 24	Apr. 14	Sept. 24	Nov. 12	212
Eureka, Calif	Feb. 8	Nov. 21	Apr. 7	Feb. 8	Nov. 11	Nov. 26	291
Fresno, Calif	Apr. 7	Nov. 13	Apr. 14	Feb. 22	Oct. 31	Dec. 2	283
Independence, Calif	Apr. 11	Oct. 30	May 24	Apr. 6	Sept. 24	Oct. 28	205
Los Angeles, Calif	Feb. 9	None.	Feb. 17	(2)	Nov. 2	(2)	(2)
Red Bluff, Calif	Apr. 7	do	May 9	Mar. 10	Nov. 8	Dec. 6	271
Sacramento, Calif	Apr. 9	do	May 7	Feb. 19	Nov. 11	Nov. 29	283
San Bernardino, Calif	Mar. 25[1]	do	Apr. 18	Mar. 8	Oct. 23	Nov. 22	259
San Diego, Calif	None.	do	Jan. 20	(2)	Dec. 26	(2)	(2)
San Francisco, Calif	do	do	Mar. 27	Jan. 25	Dec. 4	Dec. 10	319

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[1] Temperature 32° F. or below. [2] Frosts do not occur every year. [3] Of year following.

INDEX TO ARTICLES [1]

[1] See p. 1074 for Index to Statistics.

INDEX TO STATISTICS[1]

[1] See p. 1061 for Index to Articles.